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ORIGINAL ARTICLES

SCIENTIFIC MEDICOLEGAL INVESTIGATION IN THE UNDERGRADUATE MEDICAL CURRICULUM 243
A. R. Moritz, M.D., Cleveland

AN EXPERIMENT IN MAKING THE HOSPITAL A GRADUATE MEDICAL CENTER 245
Harold Jeghers, M.D., Washington, D. C.; John O'Brien, M.D., Buffalo, and John Butler, M.D., Rochester, N. Y.

THE BASIS OF HIGH STANDARDS OF MEDICAL CARE 253
H. G. Weiskotten, M.D., Skaneateles, N. Y.

PHYSICIAN AND PATIENT 255
L. J. Regan, LL.B., M.D., Los Angeles

THE PHYSICIAN AND THE LAW 257
G. E. Hall, J.D., Chicago

CLINICAL NOTES

TRIPELENNAMINE HYDROCHLORIDE FOR TOPICAL URETHRAL ANESTHESIA 261
R. J. Fitzpatrick, M.D., Gainesville, Fla., and L. M. Orr, M.D., Orlando, Fla.

USE OF DIOCTYL SODIUM SULFOSUCCINATE (AEROSOL O. T.) FOR SEVERE CONSTIPATION 261
J. L. Wilson, M.D., and D. G. Dickinson, M.D., Ann Arbor, Mich.

SPECIAL REPORTS

Council on Foods and Nutrition

NUTRITION IN SURGICAL PATIENTS 264
J. H. Crandon, M.D., Boston

MEDICAL LICENSURE STATISTICS FOR 1954

STATE BOARDS OF MEDICAL LICENSURE 269

BOARDS OF EXAMINERS IN THE BASIC SCIENCES 302

NATIONAL BOARD OF MEDICAL EXAMINERS 304

EDITORIALS

Medical Licensure 308
Status Report on Poliomyelitis Vaccine by the A. M. A. Board of Trustees 309
Properdin and Natural Immunity 309
Drug-Induced Hemolytic Anemia 310

THE PRESIDENT'S PAGE

A Monthly Message 311

ORGANIZATION SECTION

Statement of Dr. F. J. L. Blasingame on S. 1323 and Part E, S. 434 Before Senate Subcommittee 312
Statement of Dr. Walter S. Wiggins on S. 1323 and Part E, S. 434 Before Senate Subcommittee 313
Dr. Wilson Leaves Council Post 314
Dr. Vollan Named Dean 314
Legal Medicine Session at Atlantic City Meeting 314
Sex Education Pamphlets 314
New Type of Health Exhibits Planned 314
Regional Legislative Conferences 314

REGULAR DEPARTMENTS

Medical News 315
Meetings 321
Examinations and Licensure 323
Magazine-Television Report 323
Deaths 324
Foreign Letters:
Austria: Relationship of Eosinophilic Granuloma to Letterer-Siwe's Disease. Analysis of 12,000 Thyroidectomies. Therapeutic Use of Placental Extract 327
Denmark: Treatment of Manic Psychoses. Antibiotic Treatment of Whooping Cough. Restoration of the Rigshospital 327
England: General Practitioner Research. Student Health Service. Cancer of the Larynx and Bronchi. Medical Control of Professional Boxing. Edinburgh Medical Journal Ceases Publication. 328
Peru: Symposiums on Trauma, Cancer, and Surgical Tuberculosis 329
Government Services:
Secretary of Defense. Army. Navy. Veterans Administration. Public Health Service 331
Council on Medical Service:
Medical Care for the Indigent in Washington 332
Miscellany:
The Gentle Art of Poisoning 335
Walter J. Meek, Ph.D., Madison, Wis.
Medical Literature Abstracts 340
Book Reviews 352
Queries and Minor Notes:
Refrigeration of Vaccines. Dental Treatment of Cardiac Patients. Electrocardiographic Findings in Hyperkalemia. Multiple Lipomas. Serum Protein-Bound Iodine Test. Treatment of Gonorrhea. Penicillin. Ringing in Ears. Dreams. Frozen Shoulder. Silver Nitrate Stain. Excessive Coffee Drinking 356

WASHINGTON NEWS

Poliomyelitis Vaccine. Doctor Draft. Bricker Amendment. ..... Adv. Page 11
National Organizations of Medical Interest ..... Adv. Page 14
Tonics and Sedatives ..... Adv. Page 66
The Bright Side ..... Adv. Page 86
Books Received ..... Adv. Page 92
Index to Advertisers ..... Adv. Page 102

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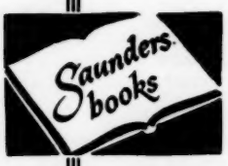

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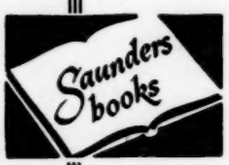

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SCIENTIFIC MEDICOLEGAL INVESTIGATION IN THE UNDERGRADUATE MEDICAL CURRICULUM

Alan R. Moritz, M.D., Cleveland

Over the centuries the amount of subject material presented to the undergraduate medical student has tended to keep pace with the growth of medical science. The tremendous expansion that has occurred in the field of medical science during the past several decades and the corresponding increase in the amount of material presented to the undergraduate student has made necessary a reevaluation of the objectives of the curriculum. Either the time allotted for undergraduate medical education must be extended or greater discrimination must be exercised as to what the medical student is to be expected to learn during this period. It seems likely that the latter alternative will be elected and that a revised curriculum will place more emphasis on fundamental principles and less on details. At present, practically every medical school in the United States is examining its curriculum with a view to determining what subject material should be curtailed or reorganized. Curtailment and better integration of subject material coverage, so as to give the student greater opportunity to grasp basic concepts and greater opportunity to develop the facility for self-education, will be the major objective of curricular change. However, the desirability of bringing to the attention of the student certain important matters, which may now be neglected, should not be overlooked.

One of these matters is a consideration of the responsibilities that devolve upon the physician to aid in the administration of justice and in the enforcement of the law of the land. In a large proportion of the hundreds of thousands of legal controversies that arise each year in the United States, both between individuals and between government and individuals, physicians are necessarily involved. A physician is involved when the issue in controversy concerns an injury or a state of disease. Only a physician can supply the critical evidence required if justice is to be based on truth. Often the medical or medicolegal problem raised by the controversy differs either in perspective or in content from those normally dealt with in medical practice. The physician who is unaware of the objectives of legal procedures, unaware of his duties and privileges as a medical witness, and unaware of how and where to get the kind of information he may need to form a competent medicolegal opinion from the medical facts at hand, will fail to discharge one of the important obligations of the medical profession to the society it serves.

Some idea of the frequency with which the physicians of this country are called upon to contribute evidence needed for legal processes may be gained by examining certain morbidity and mortality figures. According to the National Safety Council [1] there occur each year in the United States approximately 10 million injuries resulting in death or disability. The majority of these injuries are potential causes of litigation under tort law or because of some existing contractural agreement. When litigation arises from such personal injury cases, as it frequently does, the award of compensation when it is deserved, or the denial of compensation when it is undeserved, usually depends upon the kind of facts and opinions that only a physician can supply. Each year in the United States there occur approximately 100,000 deaths [2] due to violence of one kind or another, and an equal or greater number of deaths take place unexpectedly from obscure causes and are, therefore, potential cases of death by violence. Among these more than 200,000 unexplained or violent deaths each year are all the fatal accidents, suicides, and homicides that occur. Society depends upon the physicians of the country to acquire and interpret the medical evidence needed to separate the violent from the nonviolent deaths in this group; to aid in distinguishing between homicide, suicide, and misadventure; and to recognize previously unsuspected but potentially preventable hazards to public health. If these and other medicolegal responsibilities of the medical profession are ignored during undergraduate medical education, the young physician is encouraged to believe that such re-

Condensation of a paper read before the 51st Annual Congress on Medical Education and Licensure, Chicago, Feb. 7, 1955.

Professor of Pathology, Western Reserve University School of Medicine; Chairman, Committee on Medicolegal Problems, American Medical Association.

1. Accident Facts: 1953 Edition, Chicago, National Safety Council, Inc.
2. Vital Statistics of the United States 1951, vol. 2, U. S. Department of Health, Education, and Welfare, Public Health Service, 1954.

sponsibilities are unimportant and that he has no obligation to discharge them. In a recent survey [3] of the teaching of legal medicine in the medical schools of this country, it was found that there were only 16 schools in which instruction appeared to be adequate. This is probably one of the important reasons that medical science participates less effectively in the administration of justice in the United States than it does in any other comparable part of the civilized world.[4] It seems reasonable to infer that medical educators must accept the principal responsibility for this regrettable state of affairs.

RECOMMENDATIONS

What kind of education should the undergraduate curriculum provide in the field of legal medicine? The Committee on Medicolegal Problems of the American Medical Association has recently made the following recommendations [3]:

1. An effective department or division of legal medicine should be developed in every medical school.

2. The department or division of legal medicine in each medical school should teach a required course in legal medicine, dealing with basic material of general interest and importance to all physicians.

3. Elective courses dealing with forensic specialties, or with particular areas of interest, should be developed.

4. Teaching should not be restricted to undergraduate medical students, but opportunity should be provided for the training of graduate physicians in such special techniques of medicolegal investigation as forensic pathology, toxicology, hematology, and immunology.

5. Postgraduate seminars should be provided to meet the need of those engaged in medicolegal work, such as coroners, medical examiners, pathologists, interested practicing physicians, technicians in police science laboratories, and representative members of district attorneys' staffs.

6. The staff of the department or division of legal medicine should encourage the development and participate in the conduct of courses in the neighboring law schools.

7. There should be a close working relationship between the staff of the department or division of legal medicine in the medical school and the local office of the coroner or the medical examiner. Further, it is desirable that one or more members of the professional staff of that office have appointments on the teaching staff of the department.

The Committee's recommendations in respect to specific subjects in the field of scientific medicolegal investigation that should be presented to all medical students include:

Forensic pathology	6 periods
Forensic toxicology	2 periods
Blood group determinations and forensic immunology	1 period
The coroner's office and the medical examiner system as devices for investigating the cause and manner of death	1 period
Trace evidence and forensic chemistry	1 period

On first consideration, the foregoing subjects might appear to deal with matters primarily of interest to specialists attached to a coroner's office rather than to practitioners of clinical medicine. This is in fact not the case. A relatively small number of the total cases in which injury or disease results in litigation ever reach the coroner's office. Most of those that reach the coroner's office do so by way of a practitioner of medicine. The presentation of these subjects and particularly those covered by the first nine periods should concern problems that relate to civil rather than to criminal actions. Much or most of this type of subject material can be advantageously presented by the case method, whereby each student has the opportunity to examine the medical facts relevant to real or hypothetical cases and to consider their medicolegal significance before hearing them discussed by an instructor. The case method of teaching offers an excellent opportunity to consider the differences between possible and probable cause and effect relationships involving injury and disease. It also provides an opportunity to consider the rights and duties of the medical witness and to examine the merits and faults of the various types of laws and legal practices that govern the manner in which medical evidence and expert medical opinion are presented in courts of law. If instruction in these matters is to be of maximum benefit to the student it should be given as late in the period of undergraduate medical education as possible. The ideal time to present the student with legal medicine is the last semester of his fourth year.

SUMMARY

Because of the millions of disabling injuries and the hundreds of thousands of deaths from violent or obscure causes that occur each year in the United States, practitioners of medicine are frequently called upon to supply medical facts and opinions that are essential to the administration of justice and to the enforcement of the law. In general, physicians discharge these responsibilities unwillingly and with a degree of competence that is commensurate with their lack of interest and information about medicolegal problems. In contrast to British and European schools of medicine, little or no provision is made in the undergraduate curriculum of most American schools for consideration of medicolegal problems. It is, therefore, not surprising that medicine serves justice less effectively in the United States than it does elsewhere in the world. The ultimate responsibility for this situation lies with medical educators.

2085 Adelbert Rd. (6).

3. A Suggested Course in Legal Medicine for Medical Schools, report of Committee on Medicolegal Problems, Bureau of Legal Medicine and Legislation, J. A. M. A. **150**: 716 (Oct. 18) 1952.

4. Supplementary Report of Board of Trustees, report of Committee to Study the Relationship of Medicine and Law, Organization Section, J. A. M. A. **125**: 577 (June 24) 1944.

Heart Failure.—The presence of hypertension is not a contraindication to the employment of the ordinary measures in the treatment of cardiac complications, such as left ventricular failure, congestive failure and coronary occlusion. Digitalis is the best drug for helping to control congestive failure, with or without auricular fibrillation. . . . Mercurial diuretics may be of great help in promoting diuresis and lessening the burden on the heart in congestive failure, including acute left ventricular failure. Albuminuria in a hypertensive patient is for the most part evidence of cardiac failure and not of a renal inflammatory lesion and is therefore an indication for, rather than a contraindication to, the use of mercurial diuretics. Care should be taken not to combine mercurial diuretic therapy with too restricted a sodium intake; otherwise the patient will develop symptoms of sodium deficiency. In patients having prolonged diuretic therapy, potassium should be given from time to time.—J. Wright, M.D., Hypertensive Heart Disease, *The Practitioner*, February, 1955.

AN EXPERIMENT IN MAKING THE HOSPITAL A GRADUATE MEDICAL CENTER

A PRELIMINARY REPORT

Harold Jeghers, M.D., Washington, D. C., John O'Brien, M.D., Buffalo
and
John Butler, M.D., Rochester, N. Y.

During the past 20 years undergraduate medical education has in general shown notable improvement. The modern medical student receives four years of quality instruction. Graduate education (internship and residency) has also shown improvement but not to the same proportional degree nor so universally as the undergraduate period. In the postgraduate period, educational techniques are not well standardized, and they vary greatly in their effectiveness and probably even more so in the frequency with which physicians utilize them. Basically, undergraduate medical education consists of two components: (1) acquisition of a minimal factual knowledge and technical skill and (2) acquisition of the spirit of service and dedication and the desire for continual self-improvement. Examinations readily measure the first.

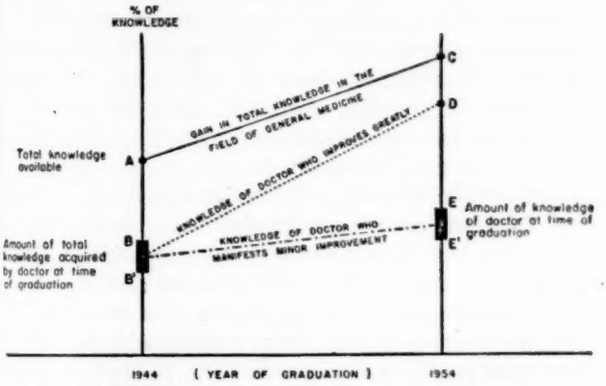

Fig. 1.—Relationship of growth in total medical knowledge and continued improvement by physicians.

Once past they give no assurance that the physician will continue to improve nor for that matter whether he might not regress. Too often they represent the last stimulus to improvement for some physicians. Yet the second concept of education more truly determines the ultimate value of the physician to society. However, it is not easy to measure, nor are these qualities easily taught except by precept and example, a situation not as readily set up for postgraduate as for undergraduate education.

Figures 1 and 2 represent schematic portrayals of this problem. In Figure 1 the vertical lines represent medical knowledge and the horizontal line time. Each year (line *A-C*) usable medical information increases. To graduate in 1944 the student must have acquired some proportion of this (*B-B'*). After graduation some physicians increase their knowledge greatly (*B-D*) but always continue to manifest a personal deficit (*C-D*), since no physician can learn everything. All physicians should understand the psychological significance of this. It means no one should lose face by admitting lack of information on some particular point. The physician who improves not at all or but slightly (*B-B'-E*) will, as time goes on, know proportionally less and less of the ever-increasing total knowledge (*A-C*) and could, if not stimulated to further education, fall below a critical level where he has less factual knowledge than new graduates, who 10 years later (1954) are expected to acquire more new knowledge than was true 10 years before. The new graduate has the advantage that he learns newly accepted facts and ideas for the first time, whereas older physicians must discard old ideas and techniques that have become habit to them and then learn the newer concepts. This is pedagogically more difficult than learning anew. The potential danger of permitting the wider spread (*D-E*) of individual skills of a group of physicians as compared to the narrow band

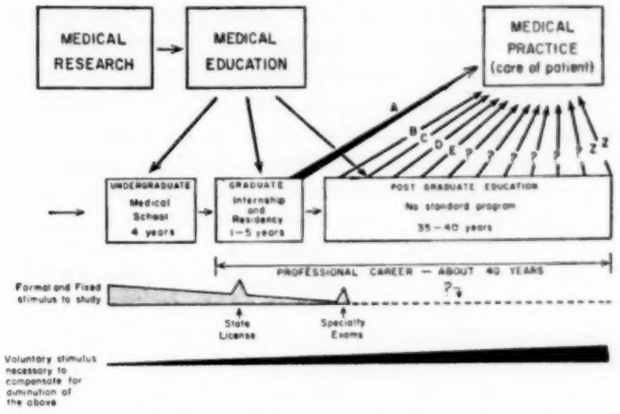
MEDICAL RESEARCH
MEDICAL EDUCATION
MEDICAL PRACTICE (care of patient)
UNDERGRADUATE Medical School 4 years
GRADUATE Internship and Residency 1–5 years
POST GRADUATE EDUCATION No standard program 35–40 years
PROFESSIONAL CAREER — ABOUT 40 YEARS
Formal and Fixed stimulus to study
State License
Specialty Exams
Voluntary stimulus necessary to compensate for diminution of the above

Fig. 2.—Relationships of undergraduate and postgraduate education.

(*B-B'*) at the time of their graduation would seem a major reason for an increased interest in postgraduate education.

Medicine in its broad sense can be broken down into three basic activities (fig. 2). The first is devoted to increasing knowledge, medical research. The third component is the practice of medicine or care of patients. Fundamentally, the reason for research and development of new facts is to apply them to improvement in patient care or prevention of disease. It is almost impossible for the busy practitioner to evaluate the highly technical basic medical and preclinical scientific research placed on record each year and apply it to his patients. The second activity that links medical research to medical practice is the intermediary role played by medical education. Essentially this is concerned with the transmission of basic

From Georgetown University Medical Center (Dr. Jeghers), Mercy Hospital (Dr. O'Brien), and St. Mary's Hospital (Dr. Butler).

Condensation of a paper read before the 51st Annual Congress on Medical Education and Licensure, Chicago, Feb. 7, 1955.

information to the undergraduate student, graduate student, and practitioner in an understandable fashion.[1] Medical education should be looked upon as a speciality requiring special skills the same as surgery. The span over which graduate and postgraduate education is needed is tenfold longer than the undergraduate period of four years. The great need is to make the postgraduate education period a lifelong process and equal in quality with the present high standards of undergraduate education. All physicians commence their medical school days under strong fixed stimuli to study that lessen over the years and after graduation often cease except for the state board examinations or their equivalent and the American specialty boards. The ideal is to have such outside stimuli to improve gradually replaced by lifelong voluntary desire.

IMPROVING EDUCATION IN A NONUNIVERSITY GENERAL HOSPITAL

A program now in operation to improve graduate and postgraduate education in a nonuniversity general hospital consists of an affiliation for active teaching purposes between Georgetown University School of Medicine, located in Washington, D. C., and Mercy Hospital in Buffalo, and St. Mary's Hospital in Rochester, N. Y. Mercy Hospital is a nonprofit general hospital operated by the Sisters of Mercy in the Buffalo Diocese. It has a capacity of 350 beds and 75 bassinets distributed as follows: 112 medical, 20 gynecologic, 56 obstetric, 145 surgical, and the balance on pediatrics. There were 12,300 general admissions in 1954 and 2,819 newborn infants. The staff is made up of about 56 general practitioners and 38 physicians who restrict their practice to a specialty. St. Mary's Hospital is a 335-bed, nonprofit general hospital operated by the Sisters of Charity of St. Vincent DePaul. Approximately 105 beds are devoted to medicine, 109 to surgery, 52 beds to pediatrics, and 71 beds to obstetrics and gynecology. There were 17,306 admissions during the past fiscal year. The staff is made up of about 54 general practitioners and about 100 men who restrict their practice to a specialty.

The initiation of this program arose when Mercy Hospital approached Georgetown University Medical Center in late 1949 to provide intern coverage. It was explained that this was not possible. This led to further discussion as to what could be done to initiate a program at Mercy Hospital that could attract interns. It was apparent to both the staff and the administration that lack of a house staff in a large, active, general hospital was resulting in impaired patient care. One of us (H. J.) has for many years been interested in the techniques and basic philosophies of medical education and had been gradually utilizing this field as a medium for research rather than clinical investigation. The department of medicine at Georgetown University School of Medicine had not been conducting any postgraduate courses. This led to the decision to explore what could be accomplished by bringing postgraduate education to a nonuniversity hospital rather than conducting some postgraduate courses at the university center. The basic theme was to make the practicing physicians' own hospital a graduate and postgraduate medical institution by creating an atmosphere where education was by precept and example on a day by day basis with a minimum of the usual formality of postgraduate teaching. It seemed feasible that this could be done at the same time that an intern (graduate) training program was instituted. The initial interest in this concept was in the department of medicine but has since been expanded to include all clinical divisions of the Georgetown University Medical Center.

It was felt that the most good would come if the faculty members explored this concept with no preconceived ideas as to how others had approached the problem of affiliated teaching; therefore, no attempt was made to review plans used by others either as reported in the literature or from observation by visits to them. If this concept could be established in a hospital lacking most of the accepted requisites of a teaching institution it would prove sound. In fact, the greater the initial handicaps, the more important the results. After considerable discussion a formal agreement of affiliation for teaching purposes was entered into between Georgetown University Medical Center in Washington, D. C., and Mercy Hospital in Buffalo in April, 1951. The professor of medicine at Georgetown University was appointed director of the program.

The basic philosophy was to supplement but not replace the teaching activities of the regular staff. Those who were capable of teaching would be encouraged to participate in an increasing degree. Eventually, it was hoped, the formal faculty visits could be gradually diminished and use made of them to help other hospitals initiate a similar program of improvement. In one sense the affiliation was entered into by the director of the program as a controlled experiment in graduate and postgraduate medical education. The director was most anxious to interfere in no way with the formal staff policies and membership, since it was felt that the program must sell itself by education, precept, example, and consultation and that its growth should be by slow accretion of many minor improvements rather than by administrative or executive committee directives. This policy had been used effectively in creating a new spirit with minimal friction in the department of medicine at Georgetown University School of Medicine.

The geographical distance between the two hospitals seemed an advantage; no one could question the advice and motives of faculty members, since no personal advantage could accrue to them except the satisfaction of seeing their pedagogic efforts bear fruit. The most common query has been "how can you send teachers such a long distance and not interfere with your own school activities?" Actually, most faculty members of any school who have achieved success as teachers or investigators accept several invitations in the course of a year to travel similar distances to lecture. Often such trips provide only travel expenses and fail to provide the satisfaction of progressive accomplishment for the teacher. Our concept simply organizes a series of such isolated trips into an integrated program financially beneficial to the medical school.

In late 1951, St. Mary's Hospital, Rochester, N. Y., on the basis of a favorable impression of the value of the program in Buffalo approached Georgetown. A program was developed combining both hospitals because of their

1. Jeghers, H.: Vitalizing Medical Education in Hospitals, Hospital Progress 35:60 (Oct.) 1954.

close geographical location. Prior to this second affiliation only one teacher a month went to Buffalo. With a second hospital two teachers went monthly to each institution. In early 1952 a similar agreement for a teaching affiliation was signed between St. Mary's Hospital and Georgetown University Medical Center. The one point of difference in this affiliation is that St. Mary's Hospital, approved for medical residency, did not wish to send an intern to Georgetown University Medical Center for a month of internship as was already being done by Mercy Hospital. Instead, a promising physician who wished to enter the medical residency at St. Mary's Hospital was supported by them but accepted at Georgetown University Medical Center as a first year assistant resident with a major experience in the heart station, infectious disease laboratory, hematology section, renal laboratory, or psychiatry or neurology section and had a chance to learn the ward teaching techniques and discipline of a university hospital. He then returned to the residency program at St. Mary's Hospital, where this background enabled him to better teach interns.

Each hospital pays Georgetown University Medical Center the sum of $15,000 annually. Georgetown University Medical Center pays travel cost of the teachers, provides them with an honorarium, and makes the balance of the fund available to the various clinical departments in proportion to the degree of their participation. The affiliated hospitals provide a room and maintenance to the visiting teachers. The total teaching coverage by Georgetown University Medical Center faculty members amounts to somewhat less than 125 days of teaching in a year. The fund permits two additional "geographical full-time teachers," several teaching fellows, an extra secretary, and fluid funds for trips, reprints, special events, and honorariums for guest teachers invited to Georgetown University Medical Center. This extra help minimizes many administrative tasks for the teachers and provides items increasing morale, so that the participation by faculty members has been enthusiastic. The financial support provides hours of new faculty teaching four or five times greater than the hours expended by faculty members away from Georgetown.

DIRECTOR OF MEDICAL EDUCATION—A NEW MEDICAL SPECIALTY

A major factor in the development of an effective teaching program in any large nonuniversity general hospital is the availability of a physician serving as director of medical education. There appears to be an increasing use of this concept and its acceptance as a new medical specialty. The incumbents of this position in both hospitals of the program are young internists, trained in internal medicine and certified by the American Board of Internal Medicine. Each was acceptable to Georgetown and given the rank of instructor in medicine on the school faculty. They are on an essentially full-time status at their respective hospitals. Their major obligation is coordination of the over-all educational program in the hospital, especially at the intern level. In many indirect ways they play a vital role in the promulgation of the spirit of postgraduate education. At St. Mary's Hospital the director of medical education also plays an active role in the medical residency training program.

A director of medical education acts as a liaison officer between the administration and the staff. He does relatively little teaching in the formal sense of didactic lectures or conducting of conferences, but rather acts to stimulate and does the leg work necessary to improve the regular staff conferences and organize the rounds and conferences involved with the visiting teachers. Each director of medical education has an office and secretary located on the medical floor. The directors carry on correspondence of the department devoted to such educational activities as scheduling. Each director receives a brief daily report made by the interns assigned to the medical department. The directors are responsible for the teaching program of the ward service in medicine and for arranging schedules and conducting rounds three times weekly themselves, alternating with the regular ward visit by the attending staff. The directors of medical education often see private patients for teaching purposes. They get to know the house staff intimately and play a major role in stimulating them and solving the many small personal, administrative, and technical problems that arise in any institution. The favorable influence on the morale and efficiency of the house staff as a result is in itself sufficient reason for such a position. The directors play a major role in encouraging use of the library and in its active development by being on the library committee.

It was soon evident in both hospitals that the surgical teaching program at the intern level required a more intimate supervision than could be given by the director of medical education or the staff surgeons in active practice. Accordingly, a paid part-time director of surgical education was appointed in each institution. These individuals are well-trained, board-certified young surgeons who have shown considerable interest and aptitude for teaching surgery at the bedside level with attention to preoperative and postoperative care and diagnosis rather than surgical technique. This aspect of the program has been extremely popular with the intern staff and in fact has led to a certain amount of rivalry in the quality of teaching on the medical and surgical units.

Each director of medical education maintains an active personal library of journal articles filed by subject in a large filing system. His intimate contact with each visiting teacher leads to a steady increase in his own knowledge. Although neither director was especially trained for the position, such specialized knowledge and skill has been acquired since appointment not only by experience but by supervision and advice from the many faculty members who visit regularly. Both realize that their work initially would have been easier if such an experience had been available to them in their formative years of training.

Much of the success of an intern and postgraduate training program is strongly conditioned by the organizational ability, personality, diplomacy, tact, and idealism of the director of medical education. In addition, the basic medical training of such individuals must be superior, so that they can hold the respect of the staff. The ideal background for such a position is a broad training in internal medicine. It is felt by the many teachers who visited these hospitals that a regular medical residency training of three years does not in itself supply the vital qualities and particular experience needed for this type of medical specialty.

DEVELOPING DIRECTORS OF MEDICAL EDUCATION FOR A NONUNIVERSITY TEACHING HOSPITAL

A corollary of our experience in this affiliation has been the development in the department of medicine of Georgetown University Medical Center of a specialized program to develop physicians interested in a career as director of medical education in a nonuniversity hospital. Certain specific concepts have already evolved concerning this new specialty in medicine. This type of pedagogic activity differs in many ways from that of a university faculty member whose teaching, clinical skill, investigative activities, and administrative duties are often in specialized and sometimes narrow fields and to an increasing degree by group approach. It requires, by contrast, a much broader scope of individual activities on a solo basis, with the major emphasis on teaching and administration.

During this training program the incumbents can play a helpful role in routine teaching and administrative activities of undergraduate and intern training programs in any university center. The person best suited to carry on the duties of this new specialty should be a broadly trained internist with a high degree of enthusiasm and natural aptitude for teaching and possessing some skill and liking for administration. Also important are personality, appearance, sense of dedication, diplomacy, leadership, and ability to cooperate and compromise. Above all, the individual should have superior intellectual qualifications. To succeed, the person must be able to command both the professional as well as the personal respect of a very heterogeneous group of physicians comprising any hospital staff. The status of directors of medical education is best accepted when they are on a full-time salary basis. This type of work will appeal to many topflight physicians.

The general outline of the program at Georgetown formal residency and fellowship in internal medicine University Hospital as now being evolved is as follows: An individual is selected upon completing three years of training. During the first year he is the chief resident in medicine, carries the title of a full-time instructor in medicine on the faculty, and serves as the executive officer to the department head as far as the medical ward floor of the hospital is concerned. He has living quarters and an office on the ward floor and remains generally available in the hospital except for short sign-out periods. Responsibilities include scheduling of the ward visits, contact with private doctors or those referring ward patients, and admission to and supervision of the ward service. He conducts his own "work rounds" and "teaching rounds." He is the liaison officer of the department with the nursing school, nursing staff, social workers, laboratories, and administration of the hospital. He holds frequent meetings with the nursing service, social service, dietetic service, and record room personnel. The resident sits in on or conducts the daily morning report made by the assistant residents. The format and quality of the records and a weekly record meeting with the house staff come within his purview. He sits in on all the department meetings and in general carries the major responsibility of the smooth running of the service and the integration of the teaching program with the routine care of patients.

In the second year of the program the individual serves as a full-time instructor in medicine. He now lives out but has his office on the ward floor. During this year he is responsible for the immediate supervision of the senior clerkship in ward medicine and correlation of teaching and patient care, is given a ward visit of his own, and does the leg work involved in setting up and correlating all departmental and interdepartmental teaching programs. He carries on some investigative work, is encouraged to write, and has time to read extensively.

The third year the individual continues as a full-time instructor in medicine, with an office in the hospital but with his major responsibilities concerned with senior year outpatient department teaching and general administration of the outpatient department to become familiar with its organizational problems. Also, during this year he helps with some of the general administration of the department of medicine. He has a ward visit in the hospital and does an increasing amount of teaching personally. He is encouraged to apply for admission to the American board examinations at this time. Developing a personal library of journals, reprints, various notes, and other materials filed by subject is encouraged. Such a collection may grow to fill one to two four-drawer filing cabinets before he leaves.

These three years will provide an enormous experience in the broad complex of hospital administration, clinical experience, and the philosophy and techniques peculiar to medical education. During these years those training to be medical directors meet intimately not only their own faculty but many visiting teachers and are afforded the opportunity to do some travel and make visits to other institutions. In particular they participate in the teaching program of our affiliated hospitals in Buffalo and Rochester and through contact with the directors of medical education in these hospitals learn first hand the problems involved. Such individuals could obviously adapt this training to many other types of endeavor in the broad field of medicine. A striking interest in this type of career has been expressed in our institution. Presently three persons are in training and a fourth was appointed to such a position a year ago.

PROGRAM OF VISITING TEACHERS TO MERCY AND ST. MARY'S HOSPITALS

The actual technique of conducting the teaching program in Mercy and St. Mary's Hospitals can best be given by outlining the activity of an individual teacher in a representative week. The faculty member travels from Washington to Buffalo by plane on Sunday evening, arriving late Sunday night, or goes by train on an overnight sleeper, arriving early Monday morning. He is provided with room and bath within the hospital. In a sense his visit fills the description of a "pro tem." He eats breakfast at the hospital with the director of medical education, who briefs him on the program. This affords the director an opportunity to point out in which direction the visitor's help will be most valuable. The faculty member's other meals are taken with the house staff or with the attending staff. Usually members of the attending staff invite the teacher out in the evening for dinner to their homes for

small group discussion of various problems. The younger faculty members, particularly the internists, remain three days at each hospital.

After one visit the faculty members get to know an increasing number of physicians on the staff and find a continuity of interest. Each subsequent meeting then becomes mutually more beneficial. The faculty members with talent in some basic laboratory discipline commonly give a critical consultation on this area in the hospital. Their educational contacts are not only with the house staff and the attending staff but with members of the hospital administration, directors of ancillary services, the laboratory technicians, nurses, and social workers, etc. Their visits help solve problems locally conditioned and give added authority to the director of medical education. In many ways these educational visits minimize local opposition to the program. They stimulate technicians to do better work, help correlate nursing procedures and patient care, and are indirectly of considerable help to the nursing school. They often review techniques of collecting, storing, processing, and handling laboratory specimens and review the technical details of many laboratory procedures. In a sense it gives the hospital a direct "pipe line" to the latest procedures used at a university hospital. In talks with members of the administration of the hospital the visiting faculty members comment on favorable changes and have an opportunity to point out needs or deficiencies. The administration in turn has an opportunity to question them or review any particular activity of the hospital. In particular the visitors encourage use of the library, a most critical point in stimulating self-improvement. During a typical visit there is usually only one strictly didactic session. The time is spent teaching with patients, mostly in bedside rounds or in presentations of patients before small groups made up of the house staff and interested physicians. A significant degree of "off the record" teaching takes place in the coffee shop, at lunch, at dinner, or informally in small groups in the evening.

The internist-teachers in particular play a very active role in stimulating interdepartmental teaching. The pro tem teachers also periodically hold combined sessions with the attending staff to review progress in diagnosis or treatment of some particular disease or group of diseases over the past several years. The impact and the cumulative effect of such visits over a period of several years has grown in a strikingly geometric fashion. The influence has been particularly striking during the present year. Visiting teachers often give a one-hour teaching exercise at the Kenmore Mercy Hospital near Buffalo, a hospital also directed by the Sisters of Mercy.

On Wednesday evening or late Wednesday afternoon the teacher travels from Buffalo to Rochester by train or is driven over by one of the doctors by car and is provided with a room and bath at the St. Mary's Hospital in Rochester. Here he goes through a comparable program, returning to Washington by plane on Saturday afternoon or on the night train Saturday evening. Evening or night travel for these trips has minimized loss of effective daylight teaching hours in travel.

The program has over-all direction and continuity from year to year through the professor of medicine at Georgetown University Medical Center who serves as director of the program. Initially almost all the effort was centered in teachers from the department of medicine, but it was gradually widened to include teachers from the major clinical departments, including surgery, obstetrics and gynecology, neurology, pediatrics, oncology, and psychiatry.

The benefit of visits of teachers to these hospitals is not entirely unilateral in favor of the hospital. The visiting teacher profits in many ways; this being particularly true for the younger members of the faculty. They gain maturity, learn to make decisions under a certain amount of pressure, and find the experience valuable in the type of consultation one must give in a nonuniversity hospital lacking many of the specialized laboratory tests for diagnosis to which they may be accustomed. They see practice carried on at a "grass root" level and understand better what the students face. We feel it enables them to teach at undergraduate level with better appreciation of the ultimate goal. They see mistakes, problems, and difficulties of practice away from a university center, and they learn the art and technique necessary to get teaching material over to the practicing physician. Their teaching is discussed with them by the director of medical education or the director of the program. It is the consensus of all who have made this teaching visit that the experience has been a most valuable one in many ways. There has been no reluctance on the part of faculty members to undertake such an assignment. In fact, many look upon it as an interesting interlude that gives a break in their regular routine.

RESULTS

The present report is of preliminary nature; therefore, no attempt has been made to report on certain quantitative evaluation methods that were set up at the start of the program. We feel improvement grows in a geometric fashion and that the program must be carried on for a few more years before the final analysis is made. The degree of improvement has been so noticeable as to have an impact on anyone who can compare several years ago with the present. Observation of any one small item done better is not particularly impressive; yet the total picture is made up of hundreds and thousands of such small items. Improvement only stands out when the magnitude of the total is appreciated. Major improvements in any institution are only accomplished by a program directed to a series of small items. To accomplish this the chiefs of the departments, the administrator of the hospital, the nurses, the director of medical education, and many others get together and figure out ways to do these things. They can be corrected one by one. Each minor improvement leads to a small increment of better patient care that is to the credit of the hospital as well as physicians. The patient is more satisfied, and the standing of the institution in the community enhanced. It is almost as easy to practice good hospital medicine as to practice poor hospital medicine if everybody cooperates.

The availability of a top-notch house staff has resulted in patients being studied promptly and more adequately with a noticeable improvement in the records.

Rectal examinations are done quite routinely on admission and stool adhering to the glove is used to test for occult blood. There has been a striking increase in the utilization made of pelvic examinations. In one hospital they are now routine on all medical admissions. Long-term patients with chronic illness in one instance are cared for on one floor unit. Reserving beds in other sections for more acutely ill patients greatly increases the efficiency and morale of the house staff and nurses. In one hospital routine miniature chest x-rays are routine on admission. Emergency carts have been set up on the floors and are readily available for the house staff and nurses. Prior to this arrangement emergency supplies were kept in one part of the hospital and obtained only after some delay. Hematocrit determinations have been

TABLE 1.—*Summary of Laboratory Data at Mercy Hospital for Fiscal Years Commencing July 1**

Test	1949 to 1950	1950 to 1951 †	1951 to 1952	1952 to 1953	1953 to 1954
Admissions, exclusive of newborn infants	9,173	10,245	11,452	12,218	12,356
Radiographic examinations	8,521	10,685	12,524	14,057	15,506
Chemistry	3,713	5,419	7,265	8,067	8,933
Bacteriology	1,530	1,850	2,309	3,598	4,597
Hematology	37,551	42,991	51,033	49,653	53,817
Gross tissue	2,595	2,369	2,790	2,765	2,504

* Routine urinalyses not tabulated.
† Affiliated program began in April, 1951.

TABLE 2.—*Summary of Consultations* and Postmortem Examinations at Mercy Hospital for Fiscal Years Commencing July 1*

Service	1949 to 1950	1950 to 1951 †	1951 to 1952	1952 to 1953	1953 to 1954
Medicine	337	408	705	857	897
Surgery	111	162	245	459	723
Obstetrics	116	106	108	165	202
Gynecology	24	15	45	202	390
Eye, ear, nose, and throat	19	80	36	85	56
Urology	61	60	84	135	242
Orthopedics	23	24	70	88	183
Pediatrics	61	82	151	236	265
Traumatic surgery	92	83	81	202	152
Newborn infants	8	43	108	192	297
Totals	852	1,013	1,633	2,571	3,407
Autopsies	79	124	149	157	174

* Consultations by regular staff.
† Affiliated program began in April, 1951.

accepted as routine in place of red blood cell counts with a low value constituting an indication for a more complete hematological study. In one hospital small laboratories have been set up on the main clinical floors where the house staff can do a limited amount of laboratory work in which they are particularly interested. They have no obligation for carrying on routine procedures but are encouraged to look at urine sediments in renal cases, blood smears in hematological cases, sputum smears, etc. The striking increase in diagnostic procedures and consultations for Mercy Hospital is shown in tables 1 and 2. These tabulations do not include those patients seen by the visiting teachers. While the number can be readily tabulated, the more effective use of them is only evident in a careful study of records.

Formerly, in both hospitals medical and surgical patients were intermingled on all floors. Initially the attitude of the nurses, administration, and staff was unfavorable to a change until the benefits were brought out. As a result of the willingness to experiment, bed arrangements were allocated on a geographical basis, with the medical patients on one floor and surgical patients on another. Improvement in nursing care was noticeable. Nurses were found to vary in their clinical interest, just as doctors and became enthusiastic about one type or the other. This led to friendly and stimulating rivalry between the staff on different floors as regards the quality of care of the patient. A particularly important ancillary benefit was that it brought physicians with similar problems together geographically and afforded them the opportunity to exchange information and to see each other's patients. There has been a noticeable increase in each hospital on the part of both the courtesy and regular staff to talk over cases with the interns who have studied their particular patient. Practicing physicians can best advance themselves by participating in the education of the house staff.

Initially no specific place for intern and resident stations was available nor any area properly suited or equipped for teaching. On each floor a conference room was provided, equipped with table, chairs, blackboard, x-ray view box and otherwise arranged for small group teaching or patient demonstrations. An intern station was provided on each floor or wing, using the dead end of halls and/or partitioning off an alcove. Hospital design usually provides for nurses stations but not as a rule a comparable area for the house staff, except in university hospitals. These appear to be just as important in a nonuniversity hospital as in the university hospital and should receive proper attention in hospital architectural plans.

A treatment room was developed on each floor, in which the emergency cart with all supplies is kept. These rooms are large enough to permit wheeling in a regular bed with the patient in it or bringing patients in for work on a specialized table. This provides greatly increased facilities for doing pelvic examinations, and a marked increase in the number done has resulted. This room is used for sigmoidoscopic examinations, paracenteses, bone marrow studies, biopsies, lumbar punctures, and, even more important, it is used to teach procedures to nurses or house staff. While increased efficiency in care of teaching resulted from all this, particularly important was the greatly improved care that patients could now be given with the same size nursing and house staff.

Several dozen teachers visiting an institution yearly can make a surprising number of valuable suggestions on many items overlooked or unknown in the hospital. In St. Mary's Hospital an increased program of health care for nurses and hospital employees was implemented by the director of medical education, providing the house staff an opportunity to see preventive measures practiced in a workable manner.

Initially, there was considerable doubt on the part of many of the attending staff members as to what could be accomplished by this program, although a strong spirit and desire to try it existed. However, the idea proved contagious and caught on. Persons initially skeptical and even antagonistic are now enthusiastic supporters; especially included are those in the group of physicians who in their school days had only a limited opportunity for a dynamic type of teaching involving the use of patients with the minimal use of didactic lectures.

MEDICAL LIBRARIES

A concerted effort was made to build up the respective hospital libraries. In Mercy Hospital a good library existed with reasonable space. The problem was primarily one of increasing its use. The full-time, professionally trained librarian utilized additional help from college and high school students to increase her services. Currently, 87 journals are received and the library contains an adequate collection of monographs, standard textbooks, and the usual index reference systems. A specialized service was developed through which during last year items were obtained from 16 outside libraries on interlibrary loans. The availability and enthusiasm of a full-time professional librarian, the increased interest and support of an active library committee, the stimulus of the teaching program, and a spirit of education in the new house staff were all reflected in a striking increase in utilization of the library particularly in collateral reading on problems encountered in the hospital. This was most striking not only in the increased reading actually done in the library, which was difficult to quantitate, but particularly in the loans from the library, which were accurately recorded. While the increase was most striking with regard to the house staff, there was a notable increase in library use by the regular staff as well. The total was an 80% increase in use of the standard textbooks and monographs and about a 400% increase in the use of medical periodicals.

The medical library at St. Mary's Hospital had lacked a full-time librarian and proper space. The medical library was reorganized, combined with the nurses' library, and placed under the direction of a very active library committee, which holds meetings once a month. This arrangement made possible the utilization of a full-time professional medical librarian. The library contains standard textbooks, monographs, and indexes. Currently the library has 51 journal subscriptions a year. Several unique ideas were instituted to increase the effectiveness of the library and reduce its operating cost. The library binds its own journals in a simple pressboard binding and keeps them on file for five years. On its own initiative, an affiliation was developed with the medical library of the local academy of medicine, and items not available from the hospital library were quickly obtained by courier service on a few hours' notice. The journals in pressboard bindings are turned over to the local academy library at the end of five years for permanent binding and use for exchange or storage; they are available on loan service. Additional items are obtained from other library sources on interlibrary loan. It is felt that this arrangement is an ideal one for a large city with a large central library.

In both hospitals the director of medical education serves on the library committee but is not chairman, since it was felt that the future success of this plan rested on the staff and its regularly appointed library committee taking the initiative. All concerned encourage use of the library; they repeatedly point out the great help that rests in such a storehouse in any hospital and how such information can help solve everyday problems encountered in medical practice. While difficult to quantitate, it is quite clear that the degree and spirit of the utilization of a hospital library reflects to a considerable degree the quality of patient care in that institution and the continued educational progression of physicians on the staff.

HOUSE OFFICERS

The undergraduate student in American medical schools has come to appreciate the vital importance of the internship in his total pattern of medical education and how greatly an internship of quality conditions his future career. He usually supports the basic premise that this is a year of education for him and not primarily one of service for the hospital. In final analysis, therefore, the effectiveness of any educational program and hospital policies can be judged in large part by how enthusiastically and in what number students apply for and accept any particular hospital appointment. It is felt at the present time data in this category were the most effective quantitative proof of what had been accomplished by the affiliated program. Data concerning the number of intern applications from approved American and Canadian schools and the number of persons appointed in each hospital for each fiscal year, commencing July 1, are given in table 3. In prior years Mercy Hospital has always had an adequate number of applicants and appointees. In 1948 there were but seven applicants and five appointed interns. In 1949 this fell to five applicants and one appointed intern. Appointments of foreign medical graduates supplemented these. In 1950 there were no applicants and an all foreign intern staff was appointed. Announcement of the formal program of affiliation made during the year 1951 produced eight applicants from American schools and six appointees. In 1952 there were seven applicants and two appointees. The effectiveness of the program was not felt until the fiscal year commencing in July, 1953, when 9 interns were appointed out of 12 applicants. The effectiveness of 1953 internship led to a large increase of the number of applications. There were 29 the next year, with the appointment of a full house staff of American graduates, numbering 20, in the fiscal year 1954. Only in the present fiscal year has the full impact of the program been reached. How much a good house staff contributes to building the teaching spirit in any hospital has now become apparent for the first time. These data show quite strikingly that once an effective house staff is lost in a hospital it is very difficult to build it up even with con-

TABLE 3.—*Intern Applicants from Approved American and Canadian Schools and Number Appointed for Each Fiscal Year Commencing July 1*

Yr.	Mercy Hospital *		St. Mary's Hospital †	
	Applicants	Appointed	Applicants	Appointed
1948	7	5	..	..
1949	5	1	..	..
1950	0	0	..	..
1951	8	6	8	7
1952	7	2	9	1
1953	12	9	24	8
1954	29	20	35	11
1955 ‡	43 §	..	86 ‖	..

* Affiliation established in April, 1951.
† Affiliation established in late 1951.
‡ Appointments for July 1, 1955, not made at time of writing.
§ 43 current applicants from 13 schools.
‖ 36 applicants from 14 schools.

siderable outside teaching except after a lag phase of several years. This grew in a geometric fashion. Apparently the most important factor was the person to person spread of information among interns and students.

St. Mary's Hospital not only conducts an approved internship but has residency programs in medicine, surgery, etc. In prior years there had never been any difficulty in the number of applications and appointments for internships and residencies. Accurate data were not available for the earlier years. In the fiscal year 1951 there was a striking drop in the applications to eight and the appointment of only one or two American graduates. This was reflected also in the fiscal year 1952, with nine applications and the appointment of only one American graduate. This led to appointment of some foreign graduates to complete the staff. Not only the effectiveness of the internship was lost to the hospital but the residency program was being jeopardized. The program of affiliation was announced during the 1952 fiscal year and led to an increase in the number of applications for 1953 fiscal year to 24, with the appointment of 8 American interns. For the present fiscal year there were 35 applicants, with 11 accepting positions on the house staff. Only in the present year has the real effectiveness of this program been felt for the first time. There are currently on file with St. Mary's Hospital 36 applications from 14 schools. It has become increasingly evident that any program for intern training must win the support of the house staff if it is to grow and develop.

The initial basic reason in both hospitals for an affiliation, namely, securing interns, had been accomplished. It has become quite clear, particularly during the present fiscal year, that the presence of an active, alert, curious house staff represents probably the most effective form of postgraduate education that can be carried on in any hospital. There has been a striking improvement in the give and take between the house staff and the attending staff and more interest shown in checking and discussing of cases. Teaching the house staff remains the best form of perpetual self-education for the practicing physician. It is also clear that much of the house staff education comes from their own attitude and desire for self-education. An enthusiastic group can get much of their stimulus from each other over the course of the year. They require, however, an over-all directed and formal program to make the internship a real educational experience. It is felt that with the development of the proper attitude on the part of the attending staff, the appointment of a director of medical education, and the help of periodic visiting teachers that the internship in this type of hospital can be increased to the point where it compares favorably to that at the university center.

GENERAL PRACTITIONER'S ASSOCIATE PROGRAM

The tendency in recent years has been for the general practitioner to do less and less hospital work as specialization plays a more prominent role in medicine. The role of the general practitioner in relation to the specialized departments around which the modern hospital revolves has become progressively more nebulous. The suggestion of the American Academy of General Practice to form a department of general practice with no clinical responsibilities has not fulfilled its aim of solving this problem. In an attempt to integrate the general practitioner into the clinical specialities for the purpose of (*a*) making the educational program accessible to him and (*b*) creating a mechanism by which staff advancement can be placed on a merit system, the general practitioner associateship program was conceived. This evolved out of a discussion between executive staff members of St. Mary's Hospital and teachers from Georgetown University. Members of the general practice department were solicited as to whether they wished to (1) become an associate in the department of medicine, obstetrics, and gynecology, or pediatrics or (2) not enter the program.

Those who chose to become associates attended the monthly meetings of the department they designated and in addition fulfilled certain other specific obligations, which differed with the department. Thus, in the department of medicine they were assigned as juniors on ward rounds for two weeks each year and were given credit for any teaching conference they attended held by the department of medicine. Members of this group were offered the opportunity to advance on the staff based on clinical ability and interest in the educational program. Those who did not choose to enter the associateship program were given the opportunity to fulfill their obligation to the hospital by attending any one of the four monthly departmental meetings they chose. They were not given the opportunity to advance on the staff. This program has proven effective in stimulating an educational interest in general practitioners and has given them an outlet for demonstrating and improving their clinical ability at a practical level.

SUMMARY AND CONCLUSIONS

A program of continuous postgraduate medical education of the practicing physician and hospital staff was organized utilizing their own hospital and patients. Clinical teachers of a medical school were brought on an active teaching basis into two distant nonuniversity hospitals on a pro tem basis periodically, with the program having over-all direction and supervision by a university professor. There is need of a physician at the local level in the capacity of a director of medical education to supervise and correlate this program. This program was effective in creating the techniques and teaching spirit of a university hospital in a nonuniversity hospital, and it was effective in raising the level of the practice of medicine in the hospitals.

Bleeding in Cirrhosis of the Liver.—An accurate determination of the course of bleeding in liver cirrhosis is important for the determination of the proper emergency and definite therapy. Much too often it is assumed that a patient who bleeds and has liver cirrhosis is bleeding from esophageal varices. . . . The commonest sources of upper gastrointestinal bleeding in liver cirrhosis are esophageal varices, hemorrhagic gastritis and duodenal ulcer. Hemorrhagic gastritis ranks almost equally with varices as a frequent cause of bleeding in cirrhosis of the liver. The differential diagnosis of bleeding in liver cirrhosis should include all of the bleeding lesions common to noncirrhotic patients in addition to esophageal and gastric varices. Esophagoscopy and gastroscopy are important adjuncts in the diagnostic study of upper gastrointestinal hemorrhage in liver cirrhosis.—A. Dagradi, M.D.; D. Sanders, M.D., and S. J. Stempien, M.D., The Sources of Upper Gastrointestinal Bleeding in Liver Cirrhosis, *Annals of Internal Medicine*, April, 1955.

THE BASIS OF HIGH STANDARDS OF MEDICAL CARE

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From the earliest periods in the history of mankind of which we have records, there has been a field of human endeavor that has dealt with the diagnosis and treatment of disease. This became known as the field of medicine and those undertaking careers in it as doctors of medicine. As early as the 12th century, it was recognized that it was in the interest of the public good that those entering upon such careers should meet certain qualifications and be licensed. Thus, medical education in some form became a requirement for those seeking the right to practice.

WORK OF ORGANIZATIONS

A year ago, on the occasion of the 50th anniversary of the Council on Medical Education, I pointed with pride to the great advances in medical education that have occurred in the United States through the efforts of the Council and the Association of American Medical Colleges in elevating standards in this field. I also pointed out that, as a result of the acceptance of these standards by the licensing boards of the individual states, a period in which there is not a single unapproved medical school operating in this country has been attained.

The Council early interested itself in the further training of the graduates of U. S. medical schools before undertaking the responsibilities of independent practice. This led to the establishment of standards for such training programs, known as internships, and the approval of hospitals for the conduct of them. Today less than 1% of medical school graduates enter practice without having had such training. I mention this to indicate the acceptance of the Council's standards by the graduates of medical schools regardless of the fact that only one-half of the states require an internship for licensure.

In the field of the specialties, the Council, with the cooperation of the Advisory Board for the Medical Specialties, has sponsored the establishment of boards representing the recognized national groups in the various specialties. Working with these boards, it has established standards for graduate training programs in more than 20 different specialties. These programs mark one of the great advances in American medicine. They serve as a guide to those who wish to undertake careers as specialists and give unofficial recognition to those who have satisfactorily completed the required training programs. Here again the graduates of medical schools who look forward to the practice of a specialty accept the standards of the Council and the specialty boards and undertake such graduate training programs before entering private practice in spite of the fact that there is no legal requirement that they do so. No longer does the public have occasion to worry about the poorly trained self-styled specialist as it did in the past. Although the trend toward specialization has been greater during recent years than one might desire, it has made available to an ever-increasing number of sections of the country highly specialized and essential services previously available in only a few scattered areas. It has been the chief factor in the increase in the number of medical centers and group clinics.

I have mentioned these developments to make clear that the efforts of the American Medical Association, its Council on Medical Education and Hospitals, the Association of American Medical Colleges, and the Federation of State Boards have had as their objectives providing all of the American public with the highest type of medical care possible.

PROBLEMS OF LICENSURE

Concurrently with these efforts there have occurred developments that have tended to defeat the attainment of these objectives insofar as assuring the public that those upon whom they may call for medical services are qualified to render them. Legislative actions in many states have forced licensing bodies to provide for the licensure of other than medical school graduates for the diagnosis and treatment of disease with or without certain limitations in their practices. Thus, many of the state licensing authorities are in the paradoxical position of accepting standards of medical organizations for licensing the graduates of medical schools and at the same time are ignoring these standards in the licensure of other groups to diagnose and treat disease—in other words to practice medicine as long as they do not designate themselves as doctors of medicine. Unfortunately, only a small percentage of the public is qualified to differentiate between the qualifications of these groups and those of the graduates of approved medical schools. The Council on Medical Education and Hospitals is prepared to cooperate with any responsible group that can demonstrate its ability to conduct programs of medical education comparable to those of the medical schools approved by it.

More recently the immigration of large numbers of foreign-trained physicians seeking the right to practice medicine in this country has presented an even greater problem to the state licensing boards. American physicians are aware of and in sympathy with the traditions of the United States and do not desire to effect any change in them that would exclude alien physicians from this country. However, they do believe that they are obligated to do everything possible to protect the American public from physicians who do not meet recognized standards for the practice of medicine. A few years ago, the Council and the Association of American Medical Colleges, to whom the licensing boards have looked for guidance, endeavored to be of assistance in evaluating the educational background of many of these foreign-trained physicians by securing dependable information

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in regard to the educational standards maintained by many of the foreign medical schools. However, the number of foreign medical schools is so large and the problem so enormous that a cooperating committee sponsored by the Council, with representation from the Association of American Medical Colleges, the Federation of State Boards of Licensure, and the American Hospital Association, is now making an intensive study of the entire problem and hopes to recommend a program whereby the licensing boards may be assured that those admitted to their examinations have had education and training comparable to the graduates of the medical schools of this country.

Accurate data in regard to numbers involved are difficult to obtain; however, the importance of the problem is indicated by the fact that estimates suggest that several thousand foreign-trained physicians will enter this country within the next two years and will seek licensure for the practice of medicine. This much is known: Within the last 20 years approximately 20,000 licensing examinations have been taken by graduates of foreign schools and more than 10,000 such graduates have been licensed. One must remember that all of these foreign graduates have the degree of doctor of medicine, and their licensure carries no differentiation from the doctors of medicine graduating from U. S. own medical schools. Unless the cooperating committee can devise some program for a competent evaluation of the educational background of foreign-trained physicians, and unless such a program is accepted by the state licensing authorities, much of the progress made in assuring the public of high standards of medical care by members of the medical profession may be lost.

PROBLEMS OF MEDICAL EDUCATION

Other trends have tended to interfere with the maintenance of present high standards of medical education in U. S. schools. Some state legislative bodies have dictated certain aspects of the admission policies of their state-supported medical schools, including the number of students to be enrolled, regardless of the effect they might have on the maintenance of educational standards. Aside from more adequate financial support, one of the greatest problems faced by a number of medical schools is the maintenance of acceptable standards with forced increases in the size of their student bodies. If this trend continues, it is bound to result in a definite lowering of educational standards in these overexpanded schools. Present standards, involving as they do the individualizing of medical education, can only be maintained when the size of the student body is commensurate with the facilities and the faculty required for such individualized training.

As there is need for an increase in the opportunities for medical education in this country, it is hoped that this need will be largely met by an increase in the number of medical schools rather than by an overexpansion of existing schools with a resultant lowering of educational standards. At the present time, six new medical schools are in various stages of development and four additional ones are being contemplated. The extent to which the full development of these schools will meet the increasing needs of the country is difficult to forsee.

The present and projected rapid increase in the population of this country, together with the projected marked increase in the number of college students, with increased demands for opportunities for medical education, are subjects that require serious study by all medical educators. Indications are that by 1960 there will be need for additional facilities and opportunities for medical education. Since it takes four to five years to develop a new medical school, now is the time to make plans to meet these needs. A number of universities not now having medical schools should seriously consider the establishment of such as parts of their educational programs.

The geographical distribution of new medical schools, integrated as they must be into medical centers and medical care programs, likewise deserves thoughtful consideration. There are today a number of areas in this country that from the standpoint of good medical care have need for the development of medical centers. Well-developed medical centers provide much of the personnel and many of the facilities required for the conduct of satisfactory programs of medical education. In some of these areas, there are also universities into which medical schools could be integrated. As there is indicated need for them, new medical schools in such areas would work out to the mutual advantage of the universities, the medical centers, and the medical schools. At the same time, they would raise the level of medical care in the area and contribute to the advancement of medicine in the country as a whole. I would like to emphasize again the willingness of the Council on Medical Education and Hospitals and the Association of American Medical Colleges to jointly cooperate freely with any responsible group interested in developing a new medical school.

COMMENT

Unless the medical profession and medical educators give serious attention to these problems, and unless the public has a clearer understanding of the medical profession's objectives and the progress being made in attaining them, one cannot hope for a general acceptance of the profession's standards. Without such acceptance, well-meaning but uninformed groups will continue to advocate solutions to these problems, which may prove to be very detrimental to the health and medical care of the American public. A few years ago, Dr. Franklin Murphy, now a member of the Council, urged the medical educators of the country to initiate an active public relations program that should result in a better understanding of the medical profession's efforts and a more adequate support of them. There is still great need for more active programs in this field. The National Fund for Medical Education is conducting such a program among the industries of the country and deserves wholehearted support. Finally, may I emphasize again that the quality of medical care rendered to the American public is dependent upon the standards of medical education maintained by medical schools and the adoption of these standards by the licensing authorities of the individual states. These standards are basic to any consideration of the socioeconomic conditions under which medical care is rendered and must have constant and continued attention.

PHYSICIAN AND PATIENT

Louis J. Regan, LL.B., M.D., Los Angeles

The physician enjoys unique privileges and opportunities; on the other hand, he is burdened with special responsibilities and obligations. The law requires that, if he presumes to take professional care of a patient, he must possess and exercise that degree of skill and care that is commonly possessed and exercised by other reputable practitioners in the locality in caring for similar cases. The patient expects the physician to be a dedicated person—gentle and kind, always available, inexhaustibly patient, everlastingly resourceful, and possessed of endless charity.

Both law and ethics join in exhorting the physician to put the patient's interest above all else, in requiring him to hold the patient's communications in confidence and to act toward the patient with the utmost good faith at all times. Ethics is derived from the Greek *ethos,* and, by extension, as it is used, it means conforming to professional standards of conduct. To such a standard the physician is bound. It is in his personal concern for his patient that the physician differs from the tradesman or the pure scientist. The secret of his successful care of his patient lies in his caring for the patient.

A good physician-patient relationship depends not only on the rendition of the best possible medical service but also on maintaining the patient's confidence and friendship. Skill is no substitute for warmth and kindness. The art of the practice of medicine is of extreme importance to the patient, and its good exercise is protective to the physician. When the patient feels a positive assurance that he is in safe hands, the solace he gets does something to his blood pressure, to his heart action, and to the functioning of his gastrointestinal tract. Emotional relief plays a part in healing organic disease.

It has been said that the physician is not a moralist. He must, nevertheless, possess high moral integrity. He has the opportunity, if not the obligation, to direct one under his professional care toward a useful and wholesome life; if exercised, the effect may frequently be of distinct therapeutic value. The physician must, in applying his skill and knowledge to accomplish the purpose for which he is employed, exercise the degree of care, attention, diligence, and judgment that is commonly exercised by other reputable practitioners in the community. He must keep abreast of progress in his profession, and he must utilize standard and accepted methods and procedures in diagnosis and in treatment.

DIAGNOSIS AND THERAPY

Occasionally the course of action selected by the physician leads to more harm than good. Thus, there are iatrogenic, physician-produced, disease states. In diagnosis, the failure to make an early determination of incipient disease is an unfortunately common error that contributes to an unhappy course of events in the future. Again, the physician's ability to make a satisfactory appraisal without betraying inaccurate impressions to the patient is important. A facial expression or a misconstrued statement during the diagnostic survey may have a decidedly adverse effect on the patient. The frequent production of cardiac cripples by misinterpretation of chest pains of functional origin is well documented. Equally well documented are the malpractice claims that eventuate.

In treatment the practice of using patent therapeutic agents without a thoroughly justifiable indication is to be condemned. There may result an immediate relief of particular symptoms only to have a severe drug reaction develop—and a suit. There are many diagnostic and therapeutic techniques in which the calculated risk of the procedure to be undertaken is very considerable. To defend successfully against a claim based upon an alleged injury resulting therefrom, the defendant must be able to justify what was done.

It is held [1] that any want of proper skill or care that diminishes the chances of the patient's recovery, prolongs his illness, increases his suffering, or, in short, makes his condition worse than it would have been if due skill and care had been used, would, in a legal sense, constitute injury. On the other hand, it is the general rule that the result of a physician's treatment is not determinative of the performance of the physician's obligation.[2] A bad result, of itself, does not give rise to an inference that the physician was negligent or lacked in skill.[3] There is no implied warranty or contract as to the result that will be obtained. The physician may, of course, contract or promise that he will effect a cure or some specific result.[4] If he does so agree, he will be liable on his special contract if the promised result is not forthcoming.

The duty of the physician to possess and to exercise the requisite degree of skill and care is imposed by the law on the relation of physician and patient. The duty is not affected by the fact that the service is rendered gratuitously, or by the fact that the physician is employed by a third person. The physician may by notice or special contract vary, limit, or modify the duty owed to his patient. Thus, he may agree to treat the patient only at a certain place or for a limited time, or for certain conditions. Of course, one who holds himself out as a specialist must possess and exercise the skill and care of the specialist.

The physician is in a position of trust and confidence as regards his patient. Thus, if he knows that he cannot accomplish a cure or that the treatment adopted will probably be of no benefit, it is his duty to advise his patient of the facts. If he believes that it would be in the

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1. *Craig* v. *Chambers,* 17 Oh. St. 253.
2. *Pepin* v. *Averill* (Vt.), 32 Atl. (2d) 665.
3. *Crouch* v. *Wyckoff* (Wash.), 107 Pac. (2d) 339.
4. *Keating v. Perkins,* 293 N.Y.S. 197.

interest of the patient to call in a consultant, he must either so advise the patient or bring in the consultant. If the patient has sustained an injury due to the physician's negligence or lack of skill, the physician has a legal duty to inform the patient. It is extremely doubtful that the physician has a therapeutic privilege to withhold a specific diagnosis from a patient with serious or fatal disease. On the contrary, it appears that in ordinary circumstances the confidential relation requires that the physician make a frank and full disclosure when his patient is adult, mentally competent, and questioning.

A physician is not required by law to accept any patient. He may, if he wishes, arbitrarily refuse the proffered professional employment even if he is the only physician available; however, once the relation of physician and patient is established, the physician has the continuing duty to give such care and treatment as necessary until his services are no longer required, unless he is sooner discharged or unless he withdraws from the case. The physician may withdraw from a case, but he must first give reasonable notice of his intention to do so, and he must allow the patient reasonable time and opportunity to fill his place. The unwarranted abandonment of a case after its assumption will render a physician liable to damages if injury results. In a Mississippi case,[5] it was held that where a physician agreed without qualification to attend the plaintiff at her approaching confinement for a stipulated sum, it was no excuse that at the time treatment became necessary he was engaged with another patient and could not leave. In another case,[6] the court said that the fact that a physician has undertaken to treat so many patients that he has to neglect some of them does not excuse him from responsibility if harm results from such neglect.

Of course, the physician may not touch, let alone operate upon, his patient without legal consent. Any adult in a clear state of mind may authorize any treatment or operation upon himself. If the patient is a minor, consent is generally to be obtained from parent or guardian. If the patient is mentally incompetent the consent of the one who stands in the position of guardian is required. In the case of surgery or any hazardous procedure, written authorization should always be obtained. In an emergency that demands immediate action for the preservation of the life or health of a patient and in which it is not practicable to obtain his consent or the consent of anyone authorized to speak for him, it is the duty of the attending physician to perform without consent such operation as good surgical practice demands. If sterility is likely to result from the procedure contemplated, explanation of that probability should be made, and a signed authorization should generally be obtained from both spouses. On the other hand, there should be no promise or guarantee that the patient will be sterile as the result of the procedure undertaken. Further, no sterilization procedure should be carried out except upon a positive medical indication. It should be understood that, if an operation is unlawful, the consent of the patient does not absolve the surgeon from liability, at least from criminal liability.

5. *Hood* v. *Moffett*, 109 Miss. 757.
6. *Young* v. *Jordan* (W.Va.), 145 S. E. 41.

MALPRACTICE

Malpractice arises out of the relationship of physician and patient. First aid may be rendered in an emergency without the establishment of the relation of physician and patient, and neither is the relationship established when: (1) the physician makes a preemployment examination for a railroad or other prospective employer, (2) the physician performs an autopsy, (3) the physician examines an applicant for life insurance on behalf of an insurance company, or (4) the physician is appointed by the trial court to examine the accused to determine the question of the accused's mental competency.

Malpractice is defined as the failure on the part of the physician to fulfill his legal duty to his patient, as a result of which the patient sustains an injury. Otherwise expressed, malpractice is the failure of the physician to care for his patient in a manner consistent with the standard of practice in the community. The standard of practice consists always of what the reputable practitioners in the community would do and in what they would refrain from doing in caring for a particular type of case. Any patient may bring a malpractice action against any physician who has cared for him professionally. Today the likelihood of the practitioner being sued for malpractice is so great that it constitutes a definite occupational hazard, and no physician is immune. During the past eight years, in a number of metropolitan areas the incidence of malpractice claims has increased by as much as 250 to 350%. In 1953, in one area one claim was advanced for each 21.6 physicians in the locality. Under such conditions the lot of the practitioner is an unhappy one. He has to realize that any patient he sees may sue him, particularly any patient with an unhappy end-result. It is to be kept in mind, too, that the great majority of these claims are not meritoriously foundationed. They are not justifiable. Furthermore, it is not only the quack or the charlatan who is being sued. In some areas far more than half of these actions are brought against physicians who are above the median of their groups in standing, experience, and reputation.

Thus, it becomes absolutely necessary that the physician learn what he may do to safeguard himself and how to put himself in the best possible position for efficient defense against the seemingly inevitable suit. First and foremost, of course, he must care for every patient with meticulous attention to the requirements of good practice. He must carefully see to it that there is a sufficiency of observation, investigation, and treatment, including the utilization of every indicated laboratory aid. He must exercise care in selecting and in delegating duties to his assistants. He must maintain a safe environment in which to work, causing instruments to be checked and apparatus to be calibrated as required in the exercise of ordinary care. His obligation comprehends, too, instructing those caring for the patient, so that all things needed may be carried out during his absence, and providing for the protection of those coming in contact with the patient. The physician must also recognize the importance of psychological factors and constructively influence the nervous, mental, and emotional balance of his patient by tactful and intelligent handling, instituting such psychotherapeutic measures as may be indicated. His per-

sonal relation with his patient is of extreme importance, for a friendly patient, one who feels that everything possible is being done for him, is not likely to sue his physician even when the end-result is less than perfect.

The physician has to rely largely on his case records to establish what the patient's condition was and just what was done about it. From a medicolegal point of view the importance of good medical records can not be overemphasized. It is wise for the doctor to ask himself, while he is caring for a patient, what he would like to have in the case record if he has to use it one, three, or five years later in defending himself in court.

There is one other major safeguard that should be particularly stressed. It may be called protective consultation. It is strongly urged, upon the basis of medicolegal indication, that consultation be always had when (1) the patient is not doing well; (2) there is any unexpected reaction, untoward occurrence, or a complication or sequela develop; and (3) whenever the patient or his family is unduly complaining or expressing dissatisfaction. Few malpractice actions will be lost when independent consultation was had. It is urged that physicians freely exchange consultations for their mutual protection. All findings, recommendations, etc. should, of course, be reduced to writing and be made a part of the case record.

Both medical ethics and the physician's recognition and acceptance of his obligation prevent him from destructively criticizing the treatment rendered or the result obtained by a fellow practitioner. On the other hand, the physician will accept the opportunity to reassure and inform any patient who may be wrongfully condemning another doctor in respect to the latter's medical care.

Prevention is the best defense against malpractice. The measures here briefly considered and others that should also be brought to the student's attention have been found to be important and effective. It must be recognized that adherence to the highest possible moral and ethical standards, the constant exhibition of a high degree of care and skill, and the creation of the friendliest aura will not eliminate all false and unjustified claims of malpractice. But there will be few instances of injuries to physicians from misguided or malicious patients when practitioners understand fully how to govern and protect themselves under the law.

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THE PHYSICIAN AND THE LAW

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Our purpose in these presentations is to convince you, a group of leaders in medical education, that certain improvements should be made in the medical school curriculum. If these improvements merely involved eliminating some courses, so that faculty and student body would have things a little easier, you would probably shout "Amen" and adopt the suggestion happily. But unfortunately, I am not on this panel for the purpose of urging such a delightful idea. I am not unmindful of the way in which the medical school curriculum has become stuffed almost to the bursting point. Educators, and this is not limited to medical educators, tend to become special pleaders and to urge that their own special field of interest deserves a greater emphasis if students are to be graduated as adequately educated persons. There is still one group of special pleaders to be heard from in the medical field. The scope of interest of that group was referred to in 1952 by Dr. Ward Darley, past president of the Association of American Medical Colleges. Writing in the *Colorado Quarterly* for July, 1952, on "Education for Medicine: A Bird's Eye View," Dr. Darley said that "in addition to the problem of putting an ever increasing quantity of information into the curriculum within a certain length of time, it is now realized that more attention should be given to the significance of the interplay that is developing between medicine and our socioeconomic structure." One of the facets of this interplay is encompassed within the scope of legal medicine and medical jurisprudence, the "Johnny-come-lately" of the special pleaders. Dr. Regan has already indicated a few of the areas in which a physician should receive some indoctrination during his training period. In my discussion I would like to point out a few more and possibly amplify upon some he has already mentioned.

SUBJECTS FOR MEDICOLEGAL CURRICULUM

Workmen's Compensation.—All of the states now have enacted workmen's compensation laws, and most have enacted occupational disease laws. These laws will be a total failure if the physicians who treat the injured workmen are either not aware of the requirements of these laws or fail to comply with them. Reports of examinations and of treatment given must be filed in the prescribed form and within the prescribed time. Failure to follow the rules may result not only in the loss of a fee, which is bad enough, but also in the loss of compensation by the injured party and his dependents. A medical school cannot teach its students the detailed requirements of each state's compensation law. I would not urge that. A student should, however, be made aware of the existence of such laws before he starts to practice so that his patients, perhaps the first one who walks into his office, will not be prejudiced by their choice of physician. Furthermore, a young physician who sees his future path leading him into the field of industrial medicine generally should have some concept of the obligations that an industrial medical department owes to both management and labor. Does the usual relationship of physician and patient arise? What should be done about referrals to

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the family physician, and what is the legal, as well as ethical, relationship to the family physician? What are the legal obligations of reporting to management and to the employee matters of serious importance to the health of the worker? A recent Tennessee case resulted in a $30,000 judgment against a company because its medical department had not advised a worker that he had tuberculosis so that he would have been influenced to seek private medical care early enough to do him some good. The company had been subjecting the worker to periodic health examinations for a number of years, and apparently the court felt it should have passed along to the worker the results of such examinations. What should the industrial physician know about privileged communications? What information can properly be revealed to management without jeopardizing the confidential nature of the physician-patient relationship and the patient's right of privacy? Are your graduates aware of their responsibilities, and are your licentiates in any way examined in this field?

Reporting Wounds and Diseases.—The laws of many states and the ordinances of some of the larger cities require physicians to report various wounds and diseases to certain governmental agencies. Gunshot and stabbing wounds must often be reported to the office of the local prosecuting attorney. Contagious diseases must be reported to state or local health authorities. Epilepsy and similar diseases must be reported to commissioners of motor vehicles. Blindness and deafness must be reported to health and sometimes school officials. Here again the future physician must be told to be on the alert for these public health matters. Are your students and licentiates helped in this regard?

Keeping of Records.—I can well imagine that your schools already inculcate in your students the clinical importance and value of maintaining not merely adequate, but excellent, hospital and office records. This activity is no doubt stressed as being a necessity to the proper treatment, present and future, of a patient's condition. Above and beyond any advantage the patient may gain by having his physician maintain good records is the definite advantage that accrues to the physician himself. When a physician is hailed into court to answer to a charge of negligence in the treatment of a patient, nothing so delights the physician's lawyer as a complete, clearly stated record telling what the physician diagnosed and how he treated the patient. Nothing need be left to guesswork in preparing a defense. In addition to being helpful to the physician and his lawyer, his records may be helpful to the judge and jury. In every state, these records may be used to refresh the recollection of the physician before he testifies. In a number of states, however, these records may actually be admitted in evidence during the course of the trial. Thus, a physician's records could conceivably make or break a case. Are your students impressed with the legal as well as the clinical value of good records? Are your licentiates reminded of this by an occasional examination question on the subject?

Narcotic Laws.—The Harrison Narcotic Act and narcotic laws of the individual states place upon physicians obligations that should be explained to them before they are thrown into the rigors of a busy daily practice. It is not sufficient for a physician to know only that he cannot use narcotic drugs in his practice until he has registered with the Bureau of Narcotics and been issued a narcotic stamp. It is not sufficient that the physician know only that he must register and obtain such a stamp for every office he operates (in the event he has offices in more than one location) and that such stamp must be displayed in a prominent place in his office. It is not sufficient that the physician be told only about the record-keeping requirements of the narcotic laws and their application to his administering, dispensing, and prescribing activities. In addition, he should be given some insight into the sly and clever way in which addicts will attempt to secure narcotics from the unwary physician. They will simulate illness and substantiate it with a plausible story. They will decide to suffer from some particular disease, read everything about that disease that they can get hold of, learn every symptom, and know precisely when to flinch with pain during the physician's examination. Two quotations from the recent book entitled "The Traffic in Narcotics" by Anslinger and Tompkins will serve to illustrate this point more completely; Mr. Anslinger is the U. S. Commissioner of Narcotics. The first quotation is this:

> Some addicts go to almost unbelievable lengths to carry out their deceptions. One had been operated upon years ago for a kidney ailment. In his efforts to obtain narcotics from a physician he would claim severe pain from a kidney stone. Whenever the physician insisted upon taking an x-ray, the addict would conceal in his hand an ordinary small stone. After being prepared for the x-ray, he would then secrete the stone in a pocket of the scar tissue on his back, in the exact position of a kidney stone, thus disclosing a stone in the x-ray. On his last attempt the stone fell out and was retrieved by the technician, resulting in his prosecution and conviction to a term of a year and a day for obtaining narcotics by fraud. Some inflict wounds on themselves to simulate postoperative scars. Others use some material which will produce a real coughing fit.

The second quotation describes another actual case:

> The old man was sitting on a park bench staring into space. Dirty, disheveled, unshaven, and worse yet, broke. His main concern was tonight's lodging. Just then he noticed a rather attractive young lady approaching and much to his surprise, as she drew abreast of him, she spoke. Would he like to earn five dollars? It was very easy and it would not take long. Ten minutes later the two of them were sitting in a doctor's office. Poor father was suffering severe pains from cancer of the rectum, and a prescription for morphine was necessary. And since it was so difficult for him to get to the doctor, would it be all right if the young lady simply picked up the prescriptions in the future. Assured that it was, they departed.
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> A year later the doctor encountered the young lady on the street. "How is your Dad these days?" "Still in great pain" was the response. "Well you better bring him in and let me look him over next week," said the doctor.
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> This presented quite a quandary for the young lady for she had not the slightest idea of the whereabouts of her alleged father. But she needed drugs badly. Down town she went, searched around, hired another old bum, visited the doctor, who after a short chat, issued another prescription and continued to issue them as previously. And he might be issuing them today if our young lady drug addict had not been arrested for forging a prescription in another city. The doctor was a mighty surprised individual when Federal agents unveiled the whole story for him.

To the extent that physicians are ignorant of this seamy side of life, administration of laws relating to narcotics and other drugs as well is hampered. This can be

remedied to a great extent by a brief reference to the problem in your new and improved course in legal medicine and by an occasional question on the subject in your licensure examination.

Adoption.—In former days it was not at all uncommon for a physician to act as sort of a go-between in many adoption cases. The unwed mother client often encouraged the physician to find a good home for the baby. The physician's friends who were anxious to adopt a child would ask him to let them know if a suitable opportunity arose. In 99 cases out of 100, these informal, friendly arrangements were undoubtedly satisfactory. Unfortunately, the one bad apple spoiled the barrel. Baby farms and other terrible practices were uncovered. The result has been a change in the law in a number of states so that babies can only be adopted through approved welfare institutions. Now the physician is usually better off if he refuses to participate in these cases. In fact, he is often simply not permitted such participation. Your students should be warned of the situation in general and your licentiates should know the situation in your specific state.

Maintaining an Office.—When a physician finally receives his license it is not too unlikely that he will associate himself with an established practitioner or a group of established practitioners for a while before he has acquired enough courage and capital to strike out for himself. Before he does so he should be told of the basic obligations and privileges that will be thrust upon him and should be told of the basic obligations and privileges that his employer or employers must assume. If he steps right into a partnership he should know of his liability for the negligence of his partners. Whether a partner or merely an employee, he should be aware of his responsibility for the negligence of office nurses and technicians. Whether a partner or merely an employee, he should know about the requirements of the restrictive covenant and its validity in the eyes of the law. He should know these things so that he will be in a position to determine his course of conduct from all points of view and not just from the point of view of the financial reward that is being offered. I have many times heard recent graduates complain that they were taught to practice scientific medicine but were taught too little about the practical and legal problems of maintaining an office. You should teach this necessary basic information in your schools. You should occasionally include a question in this field in your examinations.

Giving Testimony.—During the years, the Law Department of the American Medical Association and its predecessor, the Bureau of Legal Medicine, have received many letters and phone calls from physicians, not all of them recent graduates either, who were almost terrified because they were going to have to be a witness in the trial of a lawsuit. They did not realize that a subpoena is a court order, not just a suggestion that they could accept or reject as they wished. They thought they would have to spend hours and hours of wasted time just sitting around the courthouse. They feared that the attorney for the other party would be able to make a complete fool of them on cross examination. They thought they would get into trouble by being forced to reveal what they considered to be confidential information. They thought they would have to exhibit the fruits of their training and experience without being compensated for it. It would not take much time, and even if it did it would be time well spent, to explain to medical students the way lawsuits are started and what the purpose and effect of a subpoena is. An understanding of the task of the lawyer and of the problems he is facing would ease the student's mind and enable him to see why some delay is necessary, why cross examination is necessary, and why the physician himself is a very necessary part of the administration of justice. He could be told that a well-prepared and honest and wide-awake expert witness need never be afraid of any lawyer's examination because he knows so much more about the subject of his testimony than the lawyer can possibly know. He could be told about privileged communication statutes and about confidential communications, and he could be assured that he would not subject himself to suit if he is directed by the court to answer a particular question. He could be told that in most jurisdictions he would be justified in arranging for a fee for his services as a witness, so long as payment thereof was not contingent upon the success of the side for which he testified. A word to the wise is sufficient, and a bit of general information received beforehand will allay the physician's fears of appearing in court. Does your school attempt to allay these fears? Does your board examination check into this field?

Artificial Insemination and Sterilization.—Two other trouble spots for physicians should be briefly mentioned. The first is a subject that recent publicity throughout the country is skyrocketing into considerable prominence. It is artificial insemination. A superior court here in Chicago, on last Dec. 13, rendered a decision to the effect that children resulting from artificial insemination using a donor other than the husband are illegitimate and that such procedure is contrary to public policy and good morals and constitutes adultery on the part of the mother, when done with or without the husband's consent. Although this decision is binding only in Cook County, Illinois, unless sustained by a higher court, it has been hailed as somewhat of a bombshell because there have been so few prior cases on the subject. The problem is not a new one. It has been discussed by the Law Department, and its predecessor the Bureau of Legal Medicine, on a number of occasions. There does seem to be some evidence, however, that the procedure is being resorted to more and more frequently. This means that a greater number of physicians will be more frequently questioned about its medical, and also its legal and ethical, aspects. And this means that students should be given some of the answers so that they can best serve their patients. It is not the purpose of this panel to provide a complete course in legal medicine, but only to urge the need for such a course. Perhaps the mere stating of a few questions will serve to emphasize that need. For example, is the procedure unlawful? What is the physician's responsibility in selecting a donor? What is the physician's responsibility if the resulting offspring is abnormal? Is the physician performing the act an accessory to a crime? If the physician who performs the insemination also delivers the baby, and if a donor other than the husband has been

used, how should the physician execute the birth certificate? Is the child legitimate? What, if any, written consent should the physician preserve in his files? May the procedure be used in the absence of proof of therapeutic necessity? These are but a few of the questions that have already been raised by lawyers and doctors. Moralists will raise many more. Few of these questions can yet be definitely answered. It is begging the issue, however, to give a green light to the use of the procedure merely because no present laws prohibit such use.

The other problem to be specifically mentioned is eugenic sterilization. Physicians should know the law of their state so far as permissive sterilization of the insane or feeble-minded is concerned. That will not be difficult to ascertain. They should also be cautioned about the potential dangers involved when a patient brings this kind of a story into their office. "Say doc, I'd like to ask you something. We've already got seven kids. You know—you delivered them. I guess I still owe you for the last two. I don't have much of a job. We can't afford any more—not even the ones we've got. I hear there's some kind of an operation you can perform on me or my wife to keep us from having any more." This particular case is fictitious, of course, but from discussions around the country there are plenty of real ones just like it. What should the doctor do? Here, as with artificial insemination, it is too simple an answer merely to say that the procedure may be performed because there is no law specifically prohibiting it. Your students should be told that they are treading on dangerous legal ground when they perform this operation, or any other operation, so closely allied with the future of civilization as the propagation of children, without being convinced of its therapeutic necessity. Give your students the benefit of guided discussions on artificial insemination and eugenic sterilization. Check their familiarity with these problems from time to time in your board examinations.

There are many more phases of legal medicine that I would like to discuss with you. I would like to try to convince you, if you aren't already convinced, how important it is to the physician and his patient and the public that the physician be at least aware of the medicolegal aspects of chemical tests for intoxication, abortion, commitment and treatment of mental patients, medical practice acts, quarantine and vital statistics laws, and many others. Before I close, though, I would like to tell you of a recent meeting I attended down in Knoxville, Tenn. For about 15 years the School of Law of the University of Tennessee has sponsored an annual institute on some phase of law as a part of its postgraduate education program. This year, they called it a medicolegal institute, and its purpose was to educate practicing lawyers in the art of presenting medical testimony in the trial of personal injury cases. The physicians of the Knoxville Academy of Medicine gave generously of their time and talents in discussing problems of anatomy, neurology, trauma, x-rays, use of anatomic models and charts, etc. At the final session, four physicians acted as expert witnesses and permitted themselves to be subjected to direct and cross examination under simulated courtroom conditions. From the point of view of the lawyers present, and they were from all parts of the state because that week was also Homecoming at the university, it was, I am sure, a very successful institute. The Knoxville doctors turned out to be excellent teachers. The thing about this institute—and similar ones are being held throughout the country with increasing frequency—the thing about this institute that should give us pause is this: Everything that the lawyers learn to help them in presenting a more convincing personal injury or industrial accident case (and thus enable them to obtain for their client a more adequate award—as they express it) will also enable them to present a more convincing case of malpractice against the very physicians who were teaching them. You probably have all heard the story about the difference between the lawyer and the surgeon. When the lawyer finishes a trial he says to himself, "Now what have I left out that might have helped my client." When a surgeon finishes an operation he says to himself, "Now what have I left in that might hurt my patient." The point I wish to make it this. The law schools are doing their best to teach lawyers how to utilize to their advantage everything that medicine, and science in general, has to offer to them. Medical schools can do no less. Physicians must be taught what the law has in store for them, both the pros and the cons of it. In the March, 1953, *Journal of Medical Education,* page 57, there appeared a discussion of the objectives of undergraduate medical education. Five aims are stated and aim "A" includes this: "To help the students acquire requisite knowledge of the social and cultural settings in which medical education and practice are carried on." The graduates of your schools and the licentiates of your boards, if they are to properly fill the position in society for which they are trained technically, must also be given an adequate background in legal medicine. The physician and the law—neither can exist without the other in the daily struggle for success.

535 N. Dearborn (10).

The Sympathotonic and the Vagotonic Groups.—All autonomic activity in the body is to a degree under the control of the cerebral cortex. It is largely inhibitory in nature and is of great importance in psychosomatic medicine as it relates to all branches of medical practice. . . . Autonomic functions are represented throughout the cerebral cortex in close spatial relationship to the representation of adjacent somatic structures. There are no well-defined areas where autonomic activity can be initiated, such as is the case with somatic structures, e. g., skeletal muscle. Cortical control of the autonomic nervous system is primarily inhibitory over the hypothalamus, which in turn regulates the lower brain stem and cord centers. Removal of cortical influence results in a release of the hypothalamus and in gross autonomic disturbances. . . . Autonomic functions can also be stimulated by cortical activity in an indirect manner. Through a conditioning process, certain viscera become active as an outlet for emotional tension and stress which are not overtly expressed. Either division of the autonomic nervous system can be involved. There is a tendency for one or the other division to be dominant in a particular individual, and patterns of reaction are established, often at an early age, which become characteristic of the personality and behavior of that individual. The sympathotonic group is characterized by the hypertensive, who is usually dynamic and an extrovert. The increasingly large group of allergic people are vagotonic. They are usually sensitive, shy, introverted, and very frequently highly intellectual. The recognition of either type in a patient may be of importance in handling his physical and mental ills.—L. A. Gillilan, Ph.D., "Clinical Aspects of the Autonomic Nervous System," Boston, Little, Brown & Company, 1954.

CLINICAL NOTES

TRIPELENNAMINE HYDROCHLORIDE FOR TOPICAL URETHRAL ANESTHESIA

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and
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Clinical interest in the anesthetic activity of the antihistamines has been greatly stimulated by the need to provide safe and effective anesthesia for patients who have shown atopic responses to commonly used topical anesthetic preparations. About two years ago we presented a preliminary report on the use of tripelennamine (Pyribenzamine) hydrochloride for the production of topical urethral anesthesia [1]; this report reviewed the pertinent literature. In the preliminary report the results obtained with tripelennamine hydrochloride solution in our first 100 patients were presented. A 4% solution had been used in the first 50 on a purely empirical basis, and, because of the fairly high incidence of initial burning on instillation into the anterior urethra (18 of the 50 complained of a degree of burning rated 2 to 4+), a 2% solution of the drug was used in the next 50 patients, with a gratifying reduction in that complaint. In all cases, regardless of initial burning (which was usually transitory), excellent anesthesia was obtained. Eighty-two per cent of the patients stated that tripelennamine was far more satisfactory than 4% piperocaine (Metycaine) hydrochloride, with which they were familiar from previous treatments. Several patients in the series had received dilations without the benefit of anesthesia because of previous allergic response to other topical anesthetic preparations and were convincing witnesses of the effective anesthesia produced with the antihistaminic solution.

Once the anesthetic potency of the preparation was ascertained, a 2% solution was accepted as standard and the patients were no longer informed that a new preparation was being used or asked if the medicament burned on instillation. The fact that only an occasional patient will volunteer the information that a transitory burning discomfort occurred attests to the fact that when it does occur it is seldom worthy of comment. Production of such burning in some patients appears to be an inherent quality of tripelennamine even in 0.5% solution and is not significantly altered even with the buffered nasal solution. The cessation of the burning was considered an end-point of the production of anesthesia in the original series and hence may actually be of some practical value. Regarding the question of absorption and toxicity, it was pointed out that the urethral mucous membrane is a very effective absorbing surface, as demonstrated by the fact that emesis occurs in three to five minutes after the injection of 1% apomorphine into the urethra of the male dog. Since the oral median lethal dose (L. $D._{50}$) of tripelennamine ranges from 210 mg. per kilogram of body weight in mice to 570 mg. per kilogram in male rats, it was shown that even assuming complete absorption of the amount injected into the urethra it still does not approach a dangerous dose. The results of the preliminary report therefore suggested tripelennamine as an effective and safe topical anesthetic agent for urologic use.

Immediately after the submission of the preliminary report further statistical tables were for a time compiled; however, as extensive further use failed to disclose any side-reactions or complaints, routine use of tripelennamine in place of other anesthetic solutions was adopted and statistical tabulations were discarded. In this study, with two years' additional routine use in over 2,000 patients, no untoward reactions were noted and there were practically no failures of anesthetic action. In relation to effectiveness of this or any topical anesthetic agent, three obvious but often neglected points must be kept in mind: adequate time must be allowed for production of anesthesia (disappearance of initial burning upon instillation provides a convenient end-point); topical anesthesia, however effective, is not block anesthesia and has inherent limitations in control of pain; and the most effective anesthesia does not give us license to forget the basic precept of gentleness in handling living tissues.

On the basis of our clinical experience in over 2,000 urologic cases during a two-and-one-half year period, in conjunction with the knowledge of similarly good results in other specialty practices,[2] 2% solution and 2% jelly of tripelennamine are recommended for use as preparations of a safe, potent, topical anesthetic agent in dosage not exceeding 300 mg. in adults.

1300 Kuhl Ave. (Dr. Orr).

1. Fitzpatrick, R. J.; Orr, L. M., and Stubbart, F. J.: Antihistamines as Local Anesthetic Agents for Urethral Manipulation, J. A. M. A. **150**: 1092-1094 (Nov. 15) 1952.

2. Sheddan, F. G., Jr., and Bellanger, P. M.: Topical Use of Tripelennamine in Urologic Procedures, New England J. Med. **252**: 141-143 (Jan. 27) 1955.

USE OF DIOCTYL SODIUM SULFOSUCCINATE (AEROSOL O. T.) FOR SEVERE CONSTIPATION

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and
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The purpose of this communication is to direct attention to the usefulness of dioctyl sodium sulfosuccinate (Aerosol O. T.), developed some 15 years ago, in the treatment of severe fecal impaction and lesser degrees of constipation. As one of the very first of the synthetic wetting agents it was originally popularly described in *Life* magazine without implication of medical usefulness, and readers may recall that its remarkable properties were illustrated by the cover picture of a duck sinking in water to which a small concentration of this material had been added. The effectiveness of this material for treating constipation is consequent to its ability to allow a hard fecal mass to be penetrated by water or by mineral oils so that it becomes effectively softened. Its action thus seems to be the simple physical effect one would expect

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The food absorption studies were supported by a grant from the Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

from a detergent that allows water and fatty material to be better mixed. Wide experience has confirmed the fact that this material, even with prolonged use, causes no intestinal irritation, does not interfere with normal bowel function, and brings about no other evident ill-effects. This substance has been in use now by us and our associates with a great deal of success for over 12 years. In this communication we do not attempt to offer quantitative or controlled observations regarding its effect on constipation, since no alternate series of cases of quite similar nature or degree of severity could be treated by this and other methods of therapy. Each case, in a way, has to act as its own control with comparison of results with antecedent treatment in the same patient. In severe cases of impacted feces, preceding treatment and experience quite confirms our confidence in the effectiveness of this material. In cases of milder degrees of constipation one cannot conclude with surety that other remedies would not have been as effective.

TOXICITY

Animal experiments and extensive clinical observations have failed to reveal any evidence of toxicity.[1] Fifty rats given up to 0.87 gm. per kilogram of body weight per day remained healthy for six months. Three dogs given 0.1 gm. per kilogram of body weight remained in good health for six months. Rabbits and monkeys also tolerated like doses, and white blood cell count, red blood cell count, and differential count, plus postmortem examination, revealed no abnormalities. Repeated physical examinations on men handling the drug for years have been normal. We have given individual doses of 50 mg. per kilogram of body weight to many infants without any evidence of distress. The dosage used generally for the treatment of constipation has varied considerably, depending upon the severity of the condition to be treated, but maximum dosage has been less than 2 mg. per kilogram of body weight or much less than the above doses. Many hundreds of patients under our care have taken this material over the past decade without anything that would suggest ill-effects.

ABSORPTION STUDIES

It seemed logical to expect that if this agent had any effect on absorption of food stuffs from the intestine, it would increase absorption, particularly of fats. It was our hope originally that the drug might be of therapeutic value in certain types of nutritional disorders with associated poor intestinal absorption, such as cystic fibrosis of the pancreas and celiac disease. With this possible use in mind, certain preliminary food absorption studies were made. Since it was impractical for us to do complete balance studies, simultaneous amino acid absorption curves and vitamin A absorption curves were carried out on a considerable series of infants, including four with proven cystic fibrosis of the pancreas and four with celiac disease. The details of the study will not be reported here as our results were quite equivocal. Of 10 amino-nitrogen absorption tests, 3 showed better absorption of protein with the use of dioctyl sodium sulfosuccinate, 3 showed better absorption of protein without dioctyl sodium sulfosuccinate, and 4 were essentially unchanged. Three of the vitamin A absorption curves revealed better absorption of fat with the addition of dioctyl sodium sulfosuccinate to the test mixture, and four showed better absorption of fat without it.

The results were equally inconsistent in the patients with celiac disease, those with cystic fibrosis of the pancreas, and the others. We have concluded that the variations in absorption revealed in this small series of studies resulted from day to day changes in the disease state and that the synthetic wetting agent, as we used it, had no dependable effect in either improving or inhibiting the absorption of foodstuffs from the intestine. Subsequent clinical use of the drug over long periods of time in many hundreds of cases has strengthened this impression, although it is obvious that only good balance studies can give a certain answer.

CLINICAL USE

Dioctyl sodium sulfosuccinate is marketed both in solid pellets and in 10% aqueous solution. We have used it routinely in 1% aqueous solution, diluting the commercial preparation with distilled water. In the concentrated form, this material has an exceedingly bitter taste, but in the concentrations used, the taste can easily be disguised in most vehicles. In bottle-fed infants the material can be satisfactorily added to the formula or milk. Any of the fruit juices are quite satisfactory for older children and adults. The material has been used by itself and in combination with mineral oil.

We have used dioctyl sodium sulfosuccinate in four types of patients. Its most dramatically successful and important use has been in patients with impacted feces. These have occurred most commonly in children with various types of megacolon. In several instances we have encountered such severe impaction that obstructive symptoms began to appear, and the possibility of laparotomy was entertained, since cathartics and repeated enemas of traditional types were unsuccessful. Dioctyl sodium sulfosuccinate given by mouth and by enemas, with mineral oil, has successfully softened up fecal matter too hard and too extensive to be digitally removed, so that spontaneous evacuation eventually occurred. The use of dioctyl sodium sulfosuccinate by itself should not be considered a satisfactory method of management of megacolon secondary to congenital absence or dysfunction of part of Auerbach's plexus; however, it has been exceedingly valuable as an adjunct treatment. In the care of patients with megacolon, both before and after operative interference, we have used the following medication: dioctyl sodium sulfosuccinate, 1% aqueous solution, 2 cc. three times daily, by mouth, in milk or fruit juice; and enemas of 1 or 2 oz. (30 to 60 cc.) of mineral oil; or sometimes sodium chloride, combined with 5 cc. of 1% dioctyl sodium sulfosuccinate. As an example, one patient, 19 months of age, with severe megacolon diagnosed at 3 months, had attacks of severe fecal impaction leading to obstructive vomiting in spite of energetic use of ordinary cathartics at 3 months and at 5 months of age; but the following year, with the use of dioctyl sodium

1. Benaglia, A. E.; Robinson, E. J.; Utley, E., and Cleverdon, M. A.: The Chronic Toxicity of Aerosol-O T, J. Indust. Hyg. & Toxicol. 25:175 (May) 1943.

sulfosuccinate, 15 drops twice a day by mouth and in mineral oil enemas once or twice weekly, no great difficulty with fecal retention occurred. At 16 months of age this child was subjected to the Swenson procedure (resection of the aganglionic area of the rectum or sigmoid colon) and since that time has got along very well without any treatment.

Much more common are the problems of young babies with hard lumpy feces, often after anal fissures have occurred. Although this is not an important medical problem, it is one that is very annoying to parents. Dioctyl sodium sulfosuccinate has been exceedingly useful with this problem, as the material could be used safely for relatively long periods without the disadvantage of frequent formula changes and without enemas. In this situation, 15 drops twice in a 1% solution in the formula has been satisfactory, with no additional mineral oil usually necessary. As a typical example, a 6-week-old baby, brought to the well baby clinic by its worried mother, was eating well and gaining weight but was nevertheless much disturbed, with bowel movements only every four days. The fecal mass consisted of hard lumps accompanied by three or four hours of apparent great distress on the part of the infant. Blood-streaked feces had been passed. There were palpable fecal masses in the abdomen. With the simple addition of dioctyl sodium sulfosuccinate (in the dosage prescribed above) to the formula, bowel movements became regular, without apparent discomfort. Mineral oil was used as an adjunct for a few days, but then therapy with drug alone was continued for two months without subsequent difficulty. There have been a great many such patients so treated.

Infants with postoperative anal atresia often have great difficulty in having normal defecation. It is important that the stools remain soft and pliable to protect the operative site until complete healing can occur. In these patients dioctyl sodium sulfosuccinate given by mouth (sometimes with the addition of mineral oil) has very successfully controlled the tendency toward constipation.

Poliomyelitis patients and others incapacitated by muscle weakness, who are immobilized in bed, almost without exception pass through a period of more or less severe constipation, particularly during the early periods of their illness. In patients with severe paralysis, such as those requiring the use of a respirator, constipation as a rule is very severe and presents an annoying therapeutic problem. These patients almost routinely require medication for constipation, and in such cases the disadvantage of irritant cathartics is obvious. Mineral oil alone has certain well-known disadvantages. We have for years very successfully treated such patients with dioctyl sodium sulfosuccinate and occasionally with the addition of magnesium hydroxide (Milk of Magnesia). The adults are given 2 cc. of 1% solution of dioctyl sodium sulfosuccinate and the children approximately half that dose. In severe cases, occasionally enemas with dioctyl sodium sulfosuccinate in sodium chloride solution have been necessary, and, in new patients with fecal retention, oil retention enemas with 5 cc. 1% dioctyl sodium sulfosuccinate in 3 oz. (90 cc.) of mineral oil have been used. Other cathartics are rarely necessary.

SUMMARY AND CONCLUSIONS

A synthetic wetting agent, dioctyl sodium sulfosuccinate (Aerosol O. T.), has been used extensively on the University Hospital clinical services for the past 12 years in the treatment of constipation in many different types of patients, including those severely distressed with fecal impaction associated with megacolon, anal fissure, postoperative anal atresia, and in bedridden patients of many types, including patients convalescing from poliomyelitis and some elderly invalids. In mild and moderate forms of chronic constipation this material has been found to be effective by itself. We have also found it exceedingly useful combined with mineral oil in the early treatment of the most severe constipation. Experience with many hundreds of cases failed to reveal any evidence of toxicity of any sort. A limited number of absorption studies have indicated that dioctyl sodium sulfosuccinate has no dependable and probably no significant effect upon fat or protein absorption from the intestine. In our opinion, dioctyl sodium sulfosuccinate has wide usefulness in the treatment of constipation because a good therapeutic effect can be obtained without the danger of toxicity or decreasing effectiveness even when used regularly for indefinite periods of time.

Automobile Accidents.—Since a study of the type of injuries encountered indicates that many of them could have been prevented by alterations in design of the automobile itself, . . . certain basic safety measures should be incorporated in all cars and required of all manufacturers. Among these measures which should be required are: (1) Control of speed by the development of a governor limiting the top speed to 55 miles per hour but in no way interfering with acceleration at lower speeds. The manufacturers oppose this because they stated that reserve speed is necessary in passing other cars. But if everyone knew his top speed was 55 miles per hour, he would be governed accordingly and many serious accidents and deaths would be avoided. (2) Since the majority of head injuries are due to impact against the windshield or dashboard, the windshield should be ejectable on impact, and the dashboard should be padded. Of course, all projecting knobs and buttons should be eliminated. (3) The front bumpers should be mounted on "oleo shock absorbers" in a manner similar to the landing gear in airplanes. One would not expect them to absorb all the shock of a collision, but the absorption of even a small percentage would give added safety to the passengers. (4) Since the majority of injuries suffered by the driver are chest injuries, a hydraulic steering column which will move forward under a force of approximately 100 foot pounds should be provided. (5) The backs of both front and rear seats should be rigidly locked in position; then, if waist and shoulder belts are worn by all passengers, the car itself would act as protective armor in collision and they could withstand a crash of 40G or more as has been done in airplanes. The only alternative to the use of belts is to have all guest seats face the rear of the car. (6) A flashing red light or auditory signal should be provided to indicate when a speed of 55 miles per hour has been reached, if a governor has not been installed. (7) The use of a polarized windshield would minimize glare in daytime driving and when coupled with oppositely polarized lenses on headlights, would minimize night blinding. The present day tinted windshields are dangerous when driving at night and particularly so if dark glasses are worn at the same time.—F. D. Woodward, M.D., and C. N. Moon Jr., M.D., The Physician's Responsibility in the Prevention of Automobile Accidents and Deaths, *Virginia Medical Monthly*, April, 1955.

COUNCIL ON FOODS AND NUTRITION

The following article was prepared at the request of the Council on Foods and Nutrition.

EUGENE H. STEVENSON, *Acting Secretary.*

NUTRITION IN SURGICAL PATIENTS

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The present article is in no way intended to probe the intricate phases of nutrition; rather, its purpose is to present a bird's-eye view of the over-all problem as seen by a general surgeon. For the detailed study of certain aspects of nutrition in surgical patients the reader is referred to the works of Ravdin,[1] Elman,[2] Abbott,[3] Coller,[4] Moyer,[5] Ariel,[6] and Moore [7]; and for excellent reviews, reference is made to the papers by Rhoads,[8] Levenson,[9] and Chassin.[10]

Nutrition of surgical patients requires consideration of blood and blood volume replacement and water, with and without electrolytes, as well as the utilization of calories, glucose, fat, proteins, vitamins, and minerals.

BLOOD AND BLOOD VOLUME REPLACEMENT

The prevalent keen appreciation of the necessity for adequate replacement of whole blood for maintenance of blood volume in surgical patients stems largely from the pioneer investigations of Phemister [11] and Blalock,[12] who first emphasized the frequency and importance of concealed blood loss. In patients suffering acute trauma without obvious blood loss, such as fractures, burns, or crushing injuries, the amount of blood replacement necessary has been shown to be roughly proportional to the degree of trauma.[13] Subacute or chronically ill patients coming to surgery without history of gross bleeding may show plasma volume deficits of up to 1.5 liters and whole blood deficits as high as 3 liters.[14] At operation, where the procedure is of considerable magnitude, administration of blood has become routine, the amount depending in general not only upon amount lost but also upon degree and duration of tissue trauma.[15] Postoperatively, patients suffering severe or protracted illness without bleeding are given transfusions for proper maintenance of blood volume, protein, and hemoglobin levels.[16] That serious contraction of blood volume may also result from dehydration or protein deficiency is well known.[17]

It has been demonstrated both experimentally and clinically that depletion of red blood cell mass can be tolerated much better than depletion of blood volume, which, if allowed to fall by as much as 30%, may result in fatal shock.[18] Since red blood cell count, hemoglobin, and hematocrit determinations may be notoriously misleading,[19] particularly where there has been rapid blood loss or dehydration, estimation of circulating blood volume by other means, in either the acute or the chronically ill patient, is of paramount importance. Blood volume determinations, as with the Evans blue dye technique[20] or radioactive isotopes, are far from standard procedure at this time; reliance must therefore rest upon history and physical examination. Examination of a warm, relaxed patient with marked reduction of effective circulating blood volume and without right heart failure or other cause of venous congestion will frequently reveal diminution of the caliber of the veins on the dorsum of the hands and feet when these are placed at or slightly below heart level; the extremities will be cool; also, if attempt is made to remove rapidly 10 to 20 cc. of blood from a good-sized antecubital vein of such a patient, by use of a no. 19 needle, blood will generally not flow freely into the syringe after the first 5 to 10 cc. has been withdrawn. This valuable sign, apparent to the technician or junior intern removing the blood for laboratory purposes, may escape the notice of those directing replacement therapy. In corroboration of these findings, it has been shown experimentally that venous pressure is more sensitive than arterial pressure or pulse rate in detecting blood loss.[21] Among other signs of blood volume deficit, reduction of urinary output is most important.

With respect to treatment of acute blood loss, present evidence indicates that massive, rapid transfusions of citrated blood have no effect on bleeding and clotting times [22] but may, at least in the dog, have toxic effect on the heart.[23] Many investigations have been made regarding so-called plasma expanders, with most favorable results being attained with the use of dextran.[24] It has been reported that, in the average adult with normal red blood cell mass, plasma expanders can be given up to 1,000 cc., after which whole blood must be used.[24c] The suggestions would seem to be sound that such materials rather than blood be used for the temporary support of the circulation during major operations of only moderate magnitude, where great blood loss is not anticipated.[24c] Certainly the administration of an expander rather than of 5% dextrose in water as a routine initial infusion with spinal anesthesia would seem to be logical in view of the fact that distilled water with 5% dextrose has very little effect in supporting the blood volume and is given only to replace water loss.

Experimental [25] and clinical [26] evidence indicates that, when hemoglobin or circulating red blood cell mass falls to critical levels, neither restoration of blood volume nor replenishment of tissue protein can be brought about until the severe deficiency in red blood cells is corrected; on the other hand, it has been shown that preoperative injudicious administration of whole blood to patients with "chronic shock" may lead to red blood cell, plasma, or total blood volume excesses (hypervolemia) with danger of ensuing congestive failure and/or pulmonary edema.[14b] A plea has therefore been made for more rational and specific use of whole blood, red blood cell suspensions, and albumin, separately or in combination, to meet specific needs.[27] (Plasma was purposely omitted because of the high incidence of hepatitis complicating its use.) This would appear difficult in the absence of blood volume measurements. It should be emphasized that whole blood supplies little in the way of calories or easily available protein for the metabolic pool.

WATER AND ELECTROLYTES

The present marked trend away from the use of large amounts of isotonic saline in the parenteral therapy of postoperative patients is predicated on the fact that during the immediate postoperative period there is retention of sodium, with a tendency for its migration from plasma into interstitial spaces and perhaps into the cells themselves.[28] During the first two to five postoperative days, markedly decreased urinary excretion of sodium is the rule. The noteworthy investigations of Schlegel [29] suggest that in many cases this may be the result of a drop in available sodium rather than the result of stress. There is also evidence that an antidiuretic substance may play a role in reducing urinary output.[30] According to Ariel,[6] the ability of the surgical patient to excrete water or to retain it abnormally is an individual equation and must be evaluated as such. A current practice is to administer isotonic saline and 5% dextrose postoperatively only in amounts equal to extrarenal loss, as from fistulas, vomiting, gastric suction, and perspiration, the remainder of fluid replacement consisting of dextrose and water. It is believed that, by this sparing use of saline, edema at the site of injury is avoided—a desirable goal, whether this site be anastomosis or other operative wound. The monumental work of Moore and co-workers [7b] has demonstrated that overhydration is much commoner than dehydration postoperatively and that, if the degree of hydration (saline) is carefully adjusted to the amount of existing lean tissue mass (protein), a successful outcome may be attained, even in presence of considerable protein deficiency. On the other hand, Drucker and co-workers [31] found that gastrectomized patients receiving no sodium or chloride during the first six days postoperatively accumulated deficits up to 400 mEq. of sodium and 240 mEq. of chloride during this time, the equivalent of approximately 3 liters of extracellular fluid. The danger of too strict limitation of saline in the immediate postoperative period has also been pointed

Dr. Charles S. Davidson gave advice and criticism in this study.

Because of space limitations, the bibliographic references have been omitted from THE JOURNAL and will appear in the author's reprints.

out by others,[32] although, with regard to sodium, recent investigations suggest that there may be a hitherto unsuspected available supply of this cation in bone.[33]

Today the pendulum has swung so far away from the use of isotonic saline that irrational use of 5% dextrose in water is not uncommon. Thus, newly arrived surgical patients suffering from prolonged vomiting, obstruction, diarrhea, peritonitis, or the like, have been observed to receive dextrose and water as their initial parenteral fluid therapy. It should be emphasized that water with dextrose can only aggravate an existing deficit in electrolytes [34]; moreover, in contrast to isotonic saline,[32a] its administration has little effect upon restoration of blood volume or plasma proteins.[35] The best guide to initial parenteral fluid therapy is a careful history and physical examination. In surgical patients arriving with serious electrolyte deficits or with contracted blood volume from other cause, pending calculation of specific needs and arrival of blood, the infusion of choice should be 0.9% saline with 5% detxrose, unless extreme contraindication, such as congestive failure, pulmonary edema, or anuria from renal disease, is found. In support of this, recent experimental results reaffirm considerable temporary support of contracted blood volumes by saline,[36] as opposed to glucose and water. Exceptions to this rule are premature infants, who, as emphasized by Gross,[37] tolerate saline poorly, possibly because of their relatively small lean tissue mass. For the initial parenteral therapy of severe burns, the Evans formula, or modifications thereof, is being employed with outstanding results.[13b]

In seriously ill patients showing evidence of large electrolyte deficits, the entire disease picture, rather than the blood chemistry, should be treated; and caution should be taken not to attempt too rapid correction of existing blood chemistry derangements. Particularly, administration of more than 60 cc. of isotonic saline per kilogram of body weight [5b] over the first 18 hour period in conditions other than burns may not only aggravate oliguria but also precipitate edema at the site of injury or elsewhere. Where severe electrolyte loss has occurred, it is important to differentiate between an iso-osmolar and a hypo-osmolar extracellular deficit.[38] An iso-osmolar deficit results from rapid loss of extracellular fluid containing isotonic sodium chloride and is associated with relatively normal blood electrolyte levels, diminished circulating blood volume, and hemoconcentration. It is best corrected with isotonic saline and, if shock exists, by blood or other colloid as well.[39] A hypo-osmolar extracellular fluid deficit results from a slower loss of sodium and/or chloride and water, the former loss being absolute, the latter partially compensated by intercompartmental shifts and/or water administered by mouth or vein. Under such circumstances the serum electrolyte levels are lowered, and signs of cellular overhydration, such as disorientation, restlessness, and muscular twitching may appear. Where hypo-osmolar extracellular fluid deficit exists, the judicious use of hypertonic saline has been recently recommended.[40] Thus, Schlegel [29] has pointed out that a serum sodium deficit can be corrected by intravenously administered isotonic saline only if the patient is able to excrete water without sodium almost as fast as the intravenous solution is given; the derangement will be exaggerated by infusion of more water than the kidney can excrete, which may amount to no more than 1,500 cc. daily during the immediate postoperative period. Under such circumstances hypertonic saline solution (2 to 5%) may correct more rapidly the electrolyte deficit; it may also rapidly cause serious difficulty if improperly given during the immediate postoperative period or in conditions, other than external burns, conducive to tissue edema or in the presence of impaired renal function. Needless to say, during this critical period of electrolyte replacement, surgery, if not deferred, may force a fatal issue.

The parenteral use of 10% fructose rather than 5% dextrose has received recent study, with conflicting results. Beal, Smith, and Frost [41] found that this solution was not retained as well as 10% glucose and was associated with definite increase in electrolyte excretion, which results, if confirmed, would seriously detract from its usefulness in preoperative and postoperative patients. On the other hand, others have found fructose to be utilized at a significantly more rapid rate than glucose and to thereby exert a protein-sparing effect.[42]

Certain precautions should always be kept in mind in the extensive use of distilled water and 5% dextrose. Subcutaneous administration of this solution may have a marked dehydrating effect by causing the temporary withdrawal from the circulation of sufficient electrolytes to produce isotonicity.[43] Moreover, the use of distilled water alone, either intravenously or by subcutaneous route, may produce fatality or local gangrene respectively.

During recent years potassium has become recognized as an electrolyte of extreme clinical importance. Deficiency of this cation, with concomitant derangements in sodium and chloride, may result from excessive vomiting, gastric suction, diarrhea, fistulous drainage, or exudation and may be marked by lethargy, anorexia, and ileus.[44] Electrocardiographic changes are characteristic.[45] Deficiency may be exaggerated by diuresis.[46] With migration of potassium from cells and a compensatory shift of sodium, a hypochloremic alkalosis may develop.[47] Under these circumstances administration of sodium chloride intravenously will be ineffective in raising serum chloride levels or lowering serum carbon dioxide levels until the potassium deficit has been corrected.[47a] Administration of sodium chloride to protein-depleted, potassium-deficient rats has been reported to cause lethal myocardial necrosis.[48] Postoperatively, during the first one to two days, there is no need for exogenous potassium, since an excess is supplied from the breakdown of body cells incident upon operative trauma [7a] and since urinary output will generally be low.[49] Thereafter, in patients receiving nothing by mouth and losing body fluids from whatever source, giving of supplemental potassium should be routine.[50] It is customary to administer prophylactically 40 mEq. per day, generally in 1 liter of solution, no faster than 8 to 12 cc. per minute. With large losses of body fluids, this amount may be increased. Recent evidence indicates that potassium increases the efficacy of parenteral protein alimentation.[51] Since excretion of potassium excess is dependent upon adequate urinary volume, such volume must be adequate during parenteral administration of this cation to avoid hyperpotassemia and cardiac arrest.[52]

Where prolonged intravenous therapy is required, considerable increase in efficiency has been attained by the use of an inlying polyethylene catheter [53] and the addition of 25 mg. of heparin to every liter of solution; however, the addition of heparin to solutions of fat or amino acids for intravenous administration is not advised. Such use of heparin has in our hands markedly reduced the incidence of phlebitis from "cut-downs."

PROTEINS

Surgical patients may become deficient in protein from prolonged inadequate intake, as from bowel obstruction, anorexia, or dietary restrictions; from failure of assimilation, as in liver disease or sprue; and/or from prolonged tissue loss or breakdown, as from bleeding, chronic loss of body juices, infection, diarrhea, or nephrosis. The importance of protein deficiency is indicated partly by experiments showing delayed healing of soft tissue wounds [54] and fractures,[55] decreased intestinal motility,[56] and increased sensitivity to shock [57] and to liver toxins in protein-depleted animals [58]; in part, also, it is suggested by chemical studies implicating first hypoproteinemia [59] and later tissue protein depletion [60] as a cause of wound dehiscence in man.

As with the hematocrit in blood loss, the serum protein level may be seriously misleading [61]; recent studies show that reduction of plasma volume is the more sensitive indicator of protein deficiency.[14a] History, evidence of weight loss, and signs of contracted blood volume are therefore most important in its detection. Emphasis upon preoperative replenishment of protein other than by properly restoring plasma volume and red blood cell mass would seem unrealistic in most surgical patients, since positive nitrogen balance generally cannot be attained until the required surgery has been performed. The recent investigations of Moore and co-workers [7b] suggest that moderate protein loss is compatible with recovery from surgical procedures, providing water, electrolytes, plasma, and red blood cells are maintained in proper proportions. Certainly placing a protein-depleted patient with gastrointestinal carcinoma on a high protein diet for a few days preoperatively will accomplish little. The ineffectiveness and hazards of large amounts of parenterally administered plasma or albumin for rebuilding protein stores has been

demonstrated by Albright and co-workers [62] and by Waterhouse and co-workers.[63] The daily administration of 1 to 2 liters of amino acids parenterally, representing 50 to 100 gm. of protein, together with enough calories by oral or intravenous route to provide protein-sparing effect, has been advocated by many [64] as of extreme importance, even in the absence of positive nitrogen balance. Whether the degree of tissue protein synthesis provided by such therapy over the course of a few preoperative days outweighs the possible disadvantages, such as nausea and phlebitis, is somewhat controversial. The possibility remains, however, that amino acids given parenterally before operation, even in such small amounts, may have beneficial effect where protein depletion exists.[65] In selected patients showing extreme inanition, feeding jejunostomy may be performed, but, in spite of occasional favorable reports,[66] this procedure has become a rarity. At the same time, operations of great magnitude that previously required several stages are being performed in increasing numbers in one stage, with an increasingly low mortality and morbidity rate. Thus, Localio, Stone, and Hinton [67] report eight consecutive cases of gastrojejunocolic fistula, each patient having marked weight loss, that they repaired successfully in one stage. These patients received generally 1 liter and never over 2 liters of Amigen (a protein hydrolysate) daily for an average of 6.3 days preoperatively.[68] Whether such relatively small amounts of protein administered intravenously preoperatively contributed materially to the spectacular successes achieved might be open to some question. Indeed, from a review of recent therapy and results, the conclusion must be drawn that recognition of protein depletion, with adequate blood volume replacement, proper staging of operations, better operative technique, and, particularly, the sparing administration of saline, has contributed more to improved surgical results than has preoperative replenishment of protein. This is in keeping with the finding of Rhoads and co-workers [69] that delayed wound healing in dogs made hypoproteinemic by repeated plasmapheresis could be corrected by the administration of gum acacia solution.

The pioneer investigations of Cuthbertson,[70] confirmed by the more recent studies of Moore,[7a] have shown that, characteristically, surgical patients exhibit a phase of nitrogen catabolism in the immediate postoperative period, during which increased amounts of protein nitrogen and potassium are excreted. (In the adrenalectomized rat this phenomenon does not occur.[71]) During this period, extending generally for from two to five days, a negative nitrogen balance may persist in spite of large protein intake, and caloric deficits are made up by oxidation of fat. In general, the more malnourished the patient the less protein loss there is, and vice versa. At present, there is considerable difference of opinion regarding the value of parenteral protein therapy during this period; significant reduction in the degree of negative nitrogen balance by intravenous feeding has been reported by several, including Elman,[72] Riegel,[73] and Beal,[74] while the investigations of Moore and co-workers [75] and Wilkinson and co-workers [76] indicate that the negative nitrogen balance in the immediate postoperative period is a physiological phenomenon neither requiring nor amenable to correction.

Once the postoperative phase of nitrogen catabolism has passed, there is general agreement that vigorous measures should be taken to place the patient in positive nitrogen balance. This is of particular importance in those patients having no reserves of fat and in those losing protein from infection, fistulas, open draining wounds, or burns. It is in this phase of present-day nutrition that the surgeon is apt to be most negligent. Where the restitution of positive nitrogen balance is at all questionable, the patient should be weighed frequently and his intake of food as well as his fluid loss recorded.[77] In this regard, it should be borne in mind that a patient may not only gain weight as fat while developing a protein deficiency on a high caloric–low protein diet but also lose weight while correcting his protein deficiency by excreting excess body water.[78]

Oral feeding, which is without question both preferable to and more effective than the parenteral route, may be temporarily restricted during the immediate postoperative period, in deference to intestinal suture lines vulnerable to blowout from excessive gaseous or fluid pressure or to gastroenterostomy stomas, function of which may be temporarily impaired by technical difficulties or edema. In this type of case, it has been customary to employ graduated regimens of feeding that are likely to be as important to the surgeon's peace of mind as to the patient's anastomosis. In the early feeding period, tea,[79] dry toast, gruel, and mashed potato in small amounts are well tolerated, while carbonated beverages and high-residue foods should be strictly forbidden. Solid foods stimulate peristalsis more than do liquids; but, where employment or reemployment of gastric suction may become necessary, solid residues make proper decompression difficult. More commonly, oral feeding is restricted because of ileus, and well so, since feeding a patient without adequate peristalsis will rapidly push him into serious difficulty.

Frequently, once this immediate postoperative period has passed, the problem is simply one of getting the patient continuously to eat enough of the right foods to outbalance protein loss, which, especially from burns, may be considerable. To solve this type of problem, the serving of desirable foods, increased nursing care, pleasant environment, frequent feedings, and high protein supplements must be considered. Drugs, such as phenobarbital-atropine mixtures, testosterone,[80] and chlorpromazine [Thorazine, 10(γ-dimethylaminopropyl)-2-chlorophenothiazine hydrochloride] may be helpful, although the latter should not be used until the cause of anorexia or nausea is reasonably well established.[81] In chronic cases, the judicious administration of wine or whisky in small doses may be beneficial.

In meeting body demand for protein, primary consideration must be given to caloric intake, whereby protein may be spared for tissue synthesis. In the normal average resting male, intake of 1,500 calories and 70 gm. of protein per day is considered adequate; in children these requirements are relatively higher with respect to body weight. In surgical patients, particularly those with burns, requirements may reach 5,000 calories and 400 gm. of protein, respectively, per day.[82] There is some evidence that protein synthesis may take place for short periods with inadequate caloric intake,[83] and the minimum requirements of protein for positive nitrogen balance with various levels of subnormal caloric intake are at present under investigation. If the patient cannot be supplied adequate food in his regular diet to cover his requirements, as evidenced by weight loss, contracted blood volume, and otherwise poor clinical response, supplemental feedings of high caloric–high protein mixtures may be added. The simplest and most effective of these mixtures at Boston City Hospital bears the name of the late Dr. Franklin White and consists basically of skim milk and skim milk powder. To this may be added egg, brewer's yeast, and sugar to taste. If egg white is not used, this mixture will pass through a medium-sized gavage tube without clogging. Certain commercial protein preparations have essentially the same ingredients, the chief of which is casein. Commercial preparations containing amino acid mixtures have been found frequently to produce diarrhea. Moreover, recent work indicates that, when oral mixtures of amino acids are given, there may be selective absorption of one amino acid over another, preventing thereby optimal utilization.[84]

Where the patient is refractory to oral feeding, gavage or tube feeding may be tried, but as a general rule this type of feeding is unwise in the early postoperative period, when the commonest cause of anorexia is ileus. Considerable work along these lines, with elaboration of formulas for high protein–high caloric mixtures that will not plug the tube, has been performed by Fallis [85] and Barron.[86] If gavage feedings are employed, suction of the tube before each feeding is important to rule out gastric retention with danger of subsequent vomiting and possible aspiration.

Where oral feedings are inadequate, supplemental parenteral nutrition is necessary. Over recent years amino acid mixtures for intravenous administration have received considerable attention, but results have been disappointing. For, although 2 liters of such solutions will supply 100 gm. of protein and also 100 gm. of glucose, representing 400 calories, there is frequently no way to supply at the same time the remaining calories necessary for protein-sparing effect. This may amount to from 2,000 to 5,000

calories. Efforts to approach these figures by use of hypertonic glucose solutions result in a high incidence of venous thrombosis, while too rapid infusion results not only in glycosuria but also in a higher rate of reactions, of which nausea is both most common and least desirable. The recent investigations of Cox and co-workers [83a] and of Elman [83b] indicate that for short periods at least some protein may be utilized for tissue building in the presence of inadequate caloric intake. Moreover, it appears that with very low caloric intakes (800 calories daily) improvement of nitrogen balance may be attained by increase in the ratio of protein intravenously to glucose to as high as 75%.[87]

A solution to this problem of deficient calories lies in the intravenous administration of fat, each gram of which will supply 9 calories, in contrast to the 4 supplied by 1 gm. of glucose or protein. Thus, a fat emulsion containing 15% fat and 4.3% dextrose will furnish 1,300 calories per liter. Extensive investigation of the use of such emulsions has been made by McKibbin and Stare,[88] Geyer and Stare [89] and associates,[90] and by Shafiroff and co-workers,[91] and, although reactions consisting of pyrexia and low back pain are as yet too frequent (3 to 15%) to warrant its general use, certain types of emulsion, particularly that of coconut oil, have been found so reaction-free that their availability may be shortly anticipated. Experimentally it has been shown that intravenous administration of fat emulsions may cause a prompt drop in platelet count, amounting sometimes to more than 50%.[92] This phenomenon may be at least partially reversed and the turbidity of lipemic plasma cleared by the use of heparin,[92b] but the combined use of heparin and fat solutions for intravenous administration has not yet been reported and is not advised. Clinical trials of Lipomul (vegetable oil 15% W/V and dextrose anhydrous 4% W/V have been most promising in that the solution, after a cautious start, can be run in rapidly without damage to vein or appetite. There is accumulating ample evidence that fat so administered is utilized to a high degree, as evidenced by weight gains and general clinical improvement of the patient.

VITAMINS

To date, ascorbic acid is the only nutrient lack of which has been proved to delay or prevent wound healing in man.[93] Deficiency of this vitamin causes inhibition of intercellular substance and callus formation,[94] fibroplasia,[95] and wound tensile strength.[96] With marked deficiency there is increased capillary permeability and possibly also increased susceptibility to anesthetic agents [97] and wound infection.[93c] With severe deficiency there is increased urinary excretion of intermediate breakdown products of tyrosine in the infant,[98] and also in the adult,[99] after oral doses of this amino acid. There is also decreased conversion of folic acid to citrovorum factor.[100] In contrast to the rat,[101] man shows no constant fall in blood ascorbic acid levels resulting from the stress state per se,[102] but there is evidence of an increased demand for the vitamin postoperatively, proportionate, apparently, to the degree of inflammatory response, and locally proportionate to a certain extent to the degree of local tissue stress.

Because of its ample availability and rapid absorption by all routes, there can be little excuse for surgical complications resulting from ascorbic acid lack. Diagnosis of deficiency is best made by dietary history; on physical examination the characteristic findings of scurvy are uncommon. Whereas in experimental deficiencies the blood buffy coat ascorbic acid content is the most sensitive indicator of a serious depletion, among newly arrived surgical patients a fasting plasma ascorbic acid determination has been found not only a reasonably good index of deficiency but also sufficiently simple in technique to allow its performance under average laboratory conditions.[103] Serious deficiency is not indicated until the fasting plasma ascorbic acid level falls below 0.2 mg. per 100 cc. Patients showing levels below this figure may have multiple deficiencies and also a poor prognosis surgically. For these reasons routine plasma ascorbic acid determinations may be well worth while among major surgical patients with a history of low ascorbic acid intake, even though 40% or less of those tested may be shown thereby to be deficient. At the Boston City Hospital only 6 of 46 wound disruptions could be attributed primarily to ascorbic acid deficiency; yet, among 18 patients having plasma ascorbic acid levels below 0.2 mg. per 100 cc. and receiving no ascorbic acid, 12 developed dehiscence or draining sinuses in their wounds, and 11 were dead at the end of two years.[104]

Studies of daily maintenance requirements of postoperative surgical patients for ascorbic acid, on the basis of minimal doses required to keep blood above deficiency levels, reveal a minimal requirement range of from 100 to 150 mg. per day for the uncomplicated gastrectomy to 400 mg. per day for a patient with severe, ultimately fatal ulcerative colitis.[102b] The administration of larger doses has been demonstrated to have neither harmful nor beneficial effect.

Vitamin K deficiency is characterized by a decrease in the prothrombin content of the blood with resultant defect in clotting [105] and is therefore of particular interest to the surgeon. The vitamin is contained in most foods and is also probably synthesized in the intestine, is absorbed for the most part as a fat-soluble substance, and is necessary for the manufacture of prothrombin by the liver, where it is stored in only small amounts.[106] Deficiency of prothrombin may result from liver damage [107]; from absence of bile salts in the gut, as with complete biliary fistula or obstructive jaundice [108]; from severe diarrheal disease [109]; or from administration of nonabsorbable sulfonamides for more than a few days.[110] Of the antibiotics, streptomycin given orally has a moderate inhibiting effect on synthesis and/or absorption of vitamin K,[111] while oxytetracycline (Terramycin) and neomycin appear to have no such action.[112] An idiopathic deficiency of vitamin K occurs in the newborn infant [113]; it is thus wise to give all newborn infants this vitamin daily before and after operation.[114] Deficiency also may be produced by administration of antivitamins, such as bishydroxycoumarin (Dicumarol),[115] or phenindione.[117] Where the prothrombin level is below 60% of normal, surgery is considered unwise, although recently the maintenance of anticoagulant therapy during major surgery has been reported.[118] It is likely that major surgery should not be performed where bishydroxycoumarin effect still exists, since this drug has been shown to reduce synthesis of plasma fibrinogen and is probably a liver toxin as well.[119] In general, anticoagulant therapy is not started until 24 hours have elapsed after surgery.[120]

In patients with liver disease, failure of prothrombin time to respond rapidly to vitamin K administration has been shown to be indicative of serious liver damage.[121] In patients with therapeutically induced deficiency who develop hemorrhage, treatment consists of fresh whole blood transfusions and intravenously administered vitamin K,[122] the most potent form of which appears to be vitamin K_1 emulsion in doses of 50 mg. every four hours.[123] Although response to these measures is generally prompt, in an occasional patient, bleeding once started persists to a fatal termination. Contraindications to anticoagulant therapy include recent surgery of brain or spinal cord; purpura of any type; liver or renal disease; intestinal obstruction [124]; the presence of any active inflammatory or granulating process, particularly if internal; recent cerebrovascular accident; old age; or severe trauma to any part. Because of the high morbidity rate following deep vein ligation, anticoagulant therapy appears to be gaining increasing favor, both in the presence of and as a prophylaxis against phlebothrombosis,[125] although the battle of statistics continues.[126] The therapeutic range of prothrombin time is considered to lie between 20 and 30%,[127] but it must be kept in mind that therapeutic and critical levels will vary with different laboratories.

The roles played by deficiencies of other vitamins in specifically affecting the surgical patient are based largely on results in experimental animals and to some degree upon clinical observations. Of these the most common and important deficiency is that of vitamin B_1 or thiamine, which, if severe, is known to cause disturbance of water balance [128] and is postulated to produce an unfavorable result in shock states.[129] Severe paralytic ileus resulting from thiamine deficiency has been reported,[130] as has also marked tenderness over the calf muscle mimicking phlebothrombosis.[131] Levenson and co-workers [132] have shown an increased disappearance of thiamine and riboflavin in severe burns, and recent investigations of Dumm and Ralli [133] suggest increased utilization of pantothenic acid in stress states. Evidence indicates that thiamine, nicotinamide, riboflavin, pyridoxine, and pantothenic acid all act as coenzymes in the process of cellular metabolism, while vitamin B_{12} and folic acid are essen-

tial for hematopoiesis.[134] The members of this group are found in a wide variety of fresh foods, particularly liver, and in yeast. For this reason, and because the daily requirement for them is so small, clinical evidence of their deficiency is seldom apparent. Nevertheless, because of their extreme importance, parenteral administration of the entire complex would seem advisable in patients requiring prolonged intravenous therapy or undergoing marked change of intestinal bacterial flora. Particularly, because of their importance in the utilization of carbohydrates, the routine supplementation of the B vitamins to large amounts of parenterally administered dextrose solutions would seem to be good preventive medicine. The recommended daily allowances for a normal active adult male are as follows: thiamine, 1.5 mg.; nicotinic acid, 15 mg.; riboflavin, 1.6 mg.[134] For others, the Committee on Therapeutic Nutrition recommends: pyridoxine, 0.5 mg.; pantothenic acid, 5 mg.; biotin, 100 mcg.; B_{12}, 2 mcg.; and folic acid, 0.25 mg.[134]

Fat-soluble vitamin A and its precursor, carotene, have been of surgical interest only in that their deficiency may interfere with normal epithelization. Surgically significant deficiency, resulting from inadequate intake or poor absorption due to absence of bile or prolonged excess of mineral oil[106] in the gut, is uncommon. The topical use of vitamin A in ointments for stimulation of epithelization has been recommended by some,[135] but the opinion remains widespread that for this purpose it has little merit. Concentrated supplements of vitamin A are rarely indicated in surgical patients other than infants, since body stores are relatively large. Deficiency of vitamin D, which is necessary both for retention of calcium and phosphorus and for their mobilization from the skeleton, is likewise rare in adults. Overdosage of this vitamin may contribute to the formation of renal tract stones in patients immobilized for long periods with fractures, particularly if they are on a high calcium intake.[136]

MINERALS

Surgical interest in calcium and phosphorus pertains chiefly to their relationship to renal-stone formation in immobilized patients and to abnormal metabolism in parathyroid disease. Patients requiring immobilization for conditions such as fractures excrete increased amounts of urinary calcium; for this reason, restriction of milk and other sources of calcium has been advocated to minimize renal stone formation; however, increased oral intake of calcium in the form of calcium phosphate (milk) has been shown to produce no further increase in calciuria. On the other hand, if calcium is given in the form of lactate, thereby giving a great preponderance of calcium over phosphorus, calciuria is considerably increased.[137]

In contrast, the preoperative preparation of a patient with parathyroid adenoma may include 6 to 8 gm. of calcium lactate and 100,000 to 200,000 units of vitamin D by mouth daily.[138] If the serum calcium level falls because of parathyroid ablation, inadvertent or otherwise, or because of alkalosis, tetany may develop. Parathyroid tetany should be treated with 10% calcium gluconate, 10 to 20 cc. intravenously, followed by oral doses up to 12 to 15 gm. daily, together with vitamin D. Similar intravenous doses of calcium gluconate or chloride should be given as the immediate treatment of potassium intoxication.[139] Where tetany develops from alkalosis, as in the infant with pyloric stenosis or in high intestinal obstruction, restoration of electrolyte balance is the more proper treatment, pending which surgery should be deferred.

Although evidence indicates that phosphorus is involved in all living metabolic processes, including the metabolism of carbohydrates, lipids, proteins, vitamins, and inorganic salts,[140] its surgical interest relates mainly to calcium metabolism and to its excretion relative to nitrogen as a measure of metabolism.[7a] Evidence indicates that the parathyroid hormone exerts control over renal phosphorus excretion.[137] Low serum phosphorus levels have been noted in patients suffering potassium deficits postoperatively,[131] but the clinical implications of this deficit are as yet not clear.

Iron is of a surgical interest because of its specificity in the treatment of anemia resulting from blood loss; however, since the action of iron therapy is slow and therefore of little value until the later stages of convalescence, and because of the high incidence of gastrointestinal disturbance usually associated with the oral administration of iron salts, the surgeon is generally only too glad to refer this problem to his medical colleague.

It has been generally accepted that iron is absorbed mainly in its ferrous form and that food iron is made "available" for reduction to this form by the gastric hydrochloric acid.[141] In keeping with this thesis, the majority of investigators report a high incidence (about 50%) of hypochromic microcytic anemia as a late sequel to partial or total gastrectomy, particularly in females.[142] An exception is the report of Brain and Stammers,[143] who found a high incidence of macrocytosis but no evidence of iron deficiency anemia in the follow-up of 35 patients after radical gastrectomy. Extending previous observations on the absorption of iron by the use of foods tagged with radioiron, Moore and Dubach[144] found that the addition of hydrochloric acid did not influence the absorption of food iron in patients with achlorhydria but that ascorbic acid enhanced the absorption of food iron, as previously reported by Schroder and Braun-Stappenbeck.[145] At the same time, they found that iron-deficient patients did not show more efficiency than normal persons in absorbing iron from foods, although they were more efficient in absorbing medicinal iron.

The importance of iodine with respect to surgical nutrition relates to diseases of the thyroid gland. Administration of small supplements of iodine as a preventive against endemic goiter has been well established; and, prior to the advent of the antithyroid drugs, preoperative preparation of the hyperthyroid patient with strong iodine (Lugol's) solution, 10 drops three times a day, was the only means of avoiding postoperative crises. At present, Lugol's solution is still administered as a supplement to or replacement of antithyroid drug therapy over the 10 day period immediately preceding surgery for hyperthyroidism in order to reduce the vascularity of the gland.[146] The uptake of radioactive iodine by the gland, together with conversion rate and blood protein-bound iodine determinations, are considered better indices of thyroid hyperactivity than the basal metabolic rate.[139]

At present, considerable attention is being focused on sulfur, particularly in the form of the SH-radical, with relation to its importance in wound repair. In experimental animals supplementation of low-protein diets with methionine and/or cystine resulted in measurably improved wound healing.[147] In the animals studied, there appeared to be greater correlation between sulfur intake, sulfur balance, and wound healing than between nitrogen retention and wound healing, the animals with the higher sulfur balance showing the stronger wounds.[148]

SUMMARY

In a broad sense, the surgical concept of nutrition should embrace hydration and blood replacement as well as carbohydrates, proteins, fats, vitamins, and minerals, since a circulating blood mass adequate in its component parts to compensate for the adjustments of surgical stress is of paramount importance for proper tissue nourishment. With malnourishment, there is generally contracted blood volume. Specific deficits within the vascular bed must be detected and corrected so that proper proportions of red blood cells, protein, and electrolytes are maintained at all times. Judicious adjustment of hydration to existing lean tissue mass is of more value in the preoperative period than are attempts to produce a positive nitrogen balance, which in most surgical patients is unrealistic until after corrective surgery has been performed. In the absence of adequate calories to meet body requirements, some portion of protein administered by mouth or vein may nonetheless be utilized for tissue synthesis. Parenterally administered amino acids, although disappointing, may nevertheless be of value both preoperatively and postoperatively. The advent of reaction-free fat for intravenous administration promises greatly to facilitate the problem of parenteral feeding. Particularly after the early postoperative catabolic phase, every effort must be made to improve the patient's appetite and so balance his diet that oral intake of protein and calories reaches satisfactory levels, as evidenced by weight gain, positive protein balance, and general clinical improvement. The importance of adequate and routine, rather than excessive, doses of ascorbic acid is emphasized, together with the requirements for the B vitamins and vitamin K.

MEDICAL LICENSURE STATISTICS FOR 1954

FIFTY-THIRD ANNUAL PRESENTATION OF LICENSURE STATISTICS BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

Edward L. Turner, M.D., Secretary, and Anne Tipner, Assistant to the Secretary

Table of Contents

	Page
STATE BOARDS OF MEDICAL LICENSURE	
Licenses Issued	269
Candidates Examined	274
Combined Results of Examinations	276
Failures in Medical Licensure Examinations	276
Registration by Reciprocity and Endorsement	277
Licentiates Representing Additions to the Medical Profession	281
Registration of Physicians, 1904-1954	281
Graduates of Approved Schools and Others Registered, 1922-1954	281
Graduates of Unapproved Schools Registered, 1950-1954	284
Graduates of Schools of Osteopathy Registered by Medical Examining Boards, 1950-1954	284
Preprofessional Training Requirements of Licensing Boards	286
Professional Educational Requirements of Licensing Boards	287
Approval of Medical Schools	287
Required Internships	288
Licensure Requirements for Interns and Residents in Hospitals	289
Schedule of Written Examination Dates and Reciprocity Meetings	289
Temporary and Educational Permits, Limited and Temporary Licenses, or Other Certificates Issued by State Licensing Boards	290
Medical License Fees	293
Licensure on Government Credentials	291
Annual Registration	292
Licensure of Foreign-Trained Physicians	293
Corresponding Officers of State Boards of Medical Licensure	301
BOARDS OF EXAMINERS IN THE BASIC SCIENCES	302
NATIONAL BOARD OF MEDICAL EXAMINERS	304

Statistical compilations regarding medical licensure are presented annually in the State Board Number of THE JOURNAL. The report for 1954 constitutes the 53rd annual presentation. Data are included pertaining to (*a*) medical examining and licensing boards of the United States, the District of Columbia, and the territories and outlying possessions of the United States, (*b*) the boards of examiners in the basic sciences, and (*c*) the National Board of Medical Examiners.

The computations presented are based on official records received throughout the year from all medical examining and licensing agencies of all states, Alaska, Hawaii, Guam, Puerto Rico, and the Canal Zone. No physicians were licensed for civilian practice in the Virgin Islands in 1954. The figures for Connecticut and Maryland also include data reported by the homeopathic medical examining boards of those states. The homeopathic board in Louisiana had no new licentiates last year. By act of the legislature, the eclectic and homeopathic boards in Arkansas were abolished in 1954. Data are also included pertaining to the 21 boards of examiners in the basic sciences and, lastly, the National Board of Medical Examiners. The Council and THE JOURNAL gratefully acknowledge their appreciation to those who have supplied these data as well as other records furnished throughout the year to the American Medical Association.

The tables referring to medical licensure present figures pertaining to the number of candidates examined, the number licensed, and the number who represent additions to the physician population. Data are also included pertaining to the regulations for medical licensure both of physicians who secured their professional training in the United States and Canada and of physicians educated in other countries. The state boards are discussed first, followed by the basic science boards and the National Board of Medical Examiners.

In the descriptive data reference is made to the total number of boards for which figures are reported. The figures include the examining and licensing boards in the territories and outlying possessions and also the homeopathic boards in Connecticut and Maryland.

STATE BOARDS OF MEDICAL LICENSURE

Licenses Issued

In 1954, 15,029 licenses to practice medicine were issued by 54 boards authorized by law to grant licenses to practice the art and science of medicine. The number licensed by each of these boards by examination or by the endorsement of credentials is shown in table 1. Of

TABLE 1.—*Licenses Issued, 1954*

	Examination	On the Basis of Reciprocity and Endorsement	Total
Alabama	55	88	143
Arizona	7	79	86
Arkansas	71	38	109
California	507	1,468	1,975
Colorado	97	136	233
Connecticut	38	281	319
Delaware	17	21	38
District of Columbia	11	138	149
Florida	454	0	454
Georgia	191	96	287
Idaho	5	39	44
Illinois	499	184	683
Indiana	193	178	371
Iowa	133	90	223
Kansas	122	76	198
Kentucky	115	90	205
Louisiana	270	142	412
Maine	41	54	95
Maryland	250	206	456
Massachusetts	43	398	441
Michigan	233	207	440
Minnesota	258	150	408
Mississippi	80	41	121
Missouri	244	163	407
Montana	7	52	59
Nebraska	102	32	134
Nevada	0	36	36
New Hampshire	12	43	55
New Jersey	52	329	381
New Mexico	6	51	57
New York	320	1,178	1,498
North Carolina	228	95	323
North Dakota	24	19	43
Ohio	493	352	845
Oklahoma	78	64	142
Oregon	52	93	145
Pennsylvania	305	441	746
Rhode Island	41	22	63
South Carolina	73	54	127
South Dakota	18	19	37
Tennessee	214	97	311
Texas	343	197	540
Utah	19	48	67
Vermont	14	32	46
Virginia	181	133	314
Washington	76	182	258
West Virginia	21	54	75
Wisconsin	157	119	276
Wyoming	5	19	24
Alaska	1	14	15
Canal Zone	0	12	12
Guam	0	2	2
Hawaii	9	10	19
Puerto Rico	42	40	82
Totals	6,827	8,202	15,029

Marginal Number	SCHOOL	1 Alabama P	F	2 Arizona P	F	3 Arkansas P	F	4 California P	F	5 Colorado P	F	6 Connecticut P	F	7 Delaware P	F	8 Dist. of Columbia P	F	9 Florida P	F	10 Georgia P	F	11 Idaho P	F	12 Illinois P	F	13 Indiana P	F	14 Iowa P	F	15 Kansas P	F	16 Kentucky P	F	17 Louisiana P	F	18 Maine P	F	19 Maryland P	F	20 Massachusetts P	F	21 Michigan P	F	22 Minnesota P	F
	ALABAMA																																											
1	Medical College of Alabama, Birmingham	54	0					1	0									4	2					0	1																				
	ARKANSAS																																											
2	University of Arkansas School of Medicine, Little Rock			0	1	67	0											2	1					1	2									2	0								
	CALIFORNIA																																											
3	Coll. of Medical Evangelists, Loma Linda-Los Angeles			1	0			71	1	1	0							7	2	2	0									1	0	1	0							2	0		
4	Univ. of So. California School of Med., Los Angeles			1	0			69	0																							1	0										
5	Stanford University School of Medicine, Stanford-San Francisco							54	0																									1	0								
6	Univ. of California School of Medicine, San Francisco							74	0									1	1																								
	COLORADO																																											
7	University of Colorado School of Medicine, Denver							2	0	79	0							1	0					1	0																			1	0
	CONNECTICUT																																											
8	Yale University School of Medicine, New Haven							2	0					1	0			3	1							1	0															1	0	2	0
	DISTRICT OF COLUMBIA																																											
9	Georgetown University School of Medicine															1	0	8	0															4	0								
10	George Washington University School of Medicine							2	0									10	3							3	0											1	0	1	0		
11	Howard University College of Medicine							2	0							1	0	3	0	1	0			2	0													84	2			1	0		
	GEORGIA																																											
12	Emory University School of Medicine, Atlanta													1	0			30	8	67	0											1	0										
13	Medical College of Georgia, Augusta																	10	10	73	0			1	1																		
	ILLINOIS																																											
14	Chicago Medical School							1	0									4	0	1	0			1	0																	2	0		
15	Northwestern University Medical School, Chicago			1	0	3	0	2	0			1	0					8	2					46	1	1	0	1	0			1	0			2	0			8	0	7	0
16	Stritch School of Med. of Loyola University, Chicago					8	0	1	0									7	1					36	1	3	0					1	0							2	0	4	0
17	University of Chicago, The School of Medicine					3	0			1	0							6	2	1	0			19	0	1	0			1	0			1	0			1	0	3	0	2	0	3	0
18	University of Illinois College of Medicine, Chicago					28	0	1	0									11	8					111	8	4	0	1	0	1	0			1	0	1	0	1	0			4	0	8	0
	INDIANA																																											
19	Indiana University School of Medicine, Bloomington-Indianapolis			1	0							1	0	2	0			7	2					5	1	1	3	8	0														
	IOWA																																											
20	State University of Iowa College of Med., Iowa City			1	0			2	0	2	0							4	0					3	0	2	0	9	8	0											4	0		
	KANSAS																																											
21	University of Kansas School of Medicine, Lawrence-Kansas City																	4	3											10	3	0													
	KENTUCKY																																											
22	University of Louisville School of Med., Louisville																	10	5					2	0					1	0	8	6	0								1	0		
	LOUISIANA																																											
23	Louisiana State Univ. School of Med., New Orleans																	2	1															10	1	0									
24	Tulane University of Louisiana School of Medicine, New Orleans	2	0															32	7													1	0	10	9	0								1	0
	MARYLAND																																											
25	Johns Hopkins University School of Med., Baltimore	1	0					3	1	1	0	1	0					10	2					1	0									2	0			59	0	1	0	1	0	1	0
26	University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore																	12	2					1	0									1	0	2	0	88	1	1	0			1	0
	MASSACHUSETTS																																											
27	Boston University School of Medicine							2	0									0	3							1	0							1	0			1	0			1	0		
28	Harvard Medical School, Boston	1	0					1	0							1	0	11	1	4	0			1	0									1	0					7	0	1	0	3	0
29	Tufts College Medical School, Boston																	8	4															4	0	1	0	1	0			1	0	1	0
	MICHIGAN																																											
30	University of Michigan Medical School, Ann Arbor							3	0									3	2					2	0									1	0	1	0	1	0	15	2	0	5	0
31	Wayne University College of Medicine, Detroit							1	0									2	0																					1	0	66	0		
	MINNESOTA																																											
32	University of Minnesota Medical School, Minneapolis							2	0							1	0	2	3					7	0																			135	0
	MISSOURI																																											
33	St. Louis University School of Medicine							2	0									5	1					1	1									1	0							3	0		
34	Washington University School of Medicine, St. Louis							4	1			1	0					5	0					5	0																				
	NEBRASKA																																											
35	Creighton University School of Medicine, Omaha							11	0	1	0							0	1					2	1			14	0	1	0			1	0									1	0
36	University of Nebraska College of Medicine, Omaha			1	0													5	2					2	1													1	0					5	0
	NEW YORK																																											
37	Albany Medical College																	2	0							2	0					1	0												
38	University of Buffalo School of Medicine																	4	0					1	0																				
39	Columbia University College of Physicians and Surgeons, New York																	9	1	3	0					1	0							1	0					1	0			1	0
40	Cornell University Medical College, New York							1	0	1	0							3	1	2	0			1	0													3	0	0	1	1	0	2	0
41	New York Medical College, Flower and Fifth Avenue Hospitals			2	0							2	0					4	3	1	0					2	0																		
42	New York University College of Medicine					2	1	1	0	2	0							5	3	1	0													1	0										
43	State University of New York College of Medicine, Brooklyn											1	0					7	2							2	0									1	0			1	0	1	0	1	0
44	Univ. of Rochester School of Medicine and Dentistry					6	0	1	0	3	0							3	0	1	0							1	0	1	0			1	0	1	0	3	0	1	0		
45	State Univ. of New York College of Med., Syracuse									1	0							4	1																			1	0						
		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22	

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50					
Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska, Hawaii, and Puerto Rico	Totals	Examined—Passed	Examined—Failed	Percentage Failed	No. Boards Examined by	Marginal Number
P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F					
5 0								1 0																				68	65	3	4.4	6	1
																												76	72	4	5.3	5	2
	1 0 1 0							0 1	1 0		1 0			1 0		3 0						1 0 1 0		2 0 2 0	1 0		105	101	4	3.8	20	3
								1 0																			1 0	74	74	0	0.0	6	4
																											1 0	56	56	0	0.0	3	5
								1 0																			1 0	78	77	1	1.3	4	6
		1 0							1 0 1 0								2 0											89	89	0	0.0	9	7
								2 0 1 0										2 0										16	15	1	6.3	9	8
									1 0		2 0			1 0		1 0												19	19	0	0.0	8	9
									4 0		1 0						1 0		3 0						1 0		1 0	31	28	3	9.7	11	10
1 0 6 0								4 2 5 0			1 0			3 0 1 0								1 0	2 0	1 0			73	69	4	5.5	17	11
2 0								1 1																				111	102	9	8.1	6	12
								1 0																				96	85	11	11.5	4	13
																									2 0			11	11	0	0.0	7	14
1 0	1 0				1 0			3 2 1 0	2 0 6 0		2 0 1 0						2 0 1 0	2 0 1 0				2 0		4 0			116	111	5	4.3	26	15
	1 0							2 1			11 0											1 0		8 0 1 0	2 0		91	88	3	3.3	15	16
	1 0				1 0			1 0			2 0 1 0									1 0				1 0			52	50	2	3.8	19	17
1 0			1 0					2 0			1 0		1 0 1 0			1 0			2 0 1 0			1 0 5 0		1 0		1 0	207	191	16	7.7	25	18
1 0								1 0						1 0													161	158	3	1.9	10	19
			1 0					1 0		1 0 1 0							1 0											121	121	0	0.0	13	20
													2 0												3 0			115	112	3	2.6	4	21
								1 1		3 0																		110	104	6	5.5	7	22
5 0															1 0													110	109	1	0.9	4	23
14 0									1 0							1 0			6 0								1 0	175	168	7	4.0	10	24
2 0					1 0			2 0											2 0								1 0	92	89	3	3.3	16	25
									2 0 2 0							1 0 1 0											1 0	116	113	3	2.6	12	26
																												9	6	3	33.3	6	27
4 0 1 0								1 1	10 0		2 0			1 0					8 0				1 0		1 0		1 0	63	61	2	1.6	19	28
																												20	16	4	20.0	6	29
		1 0									1 0			1 0									2 0			1 0	176	174	2	1.1	13	30
																											1 0	71	71	0	0.0	5	31
										2 0													1 0				1 0	154	151	3	1.9	8	32
	128 0							1	2		1 0			5 0											4 0		2 0	157	153	4	2.5	11	33
1 0	81 0							4	1									1 0										104	102	2	1.9	8	34
	4 0		12 0							2 0 1 0		2 0					1 0					4 0				4 0	63	61	2	3.2	16	35
			88 0														5 0					1 0				1 0	112	109	3	2.7	9	36
																												5	5	0	0.0	2	37
		1 0						1	0					1 0		1 0			1 0									10	10	0	0.0	7	38
1 0 1 0					2 0			5	1 2 0		1 0								2 0									32	30	2	6.2	13	39
2 0 1 0								5	1 1 0		1 0																	27	24	3	11.1	14	40
								0	1 1 0					1 0				1 0 2 0										20	16	4	20.0	10	41
	1 0				1 0 2 0			4	0										1 0						1 0			26	22	4	15.4	12	42
								4	1 1 0										2 0			1 0		1 1			1 0	28	24	4	14.3	13	43
	1 0				1 0 2 0			6	0	1 0 3 0				1 0 1 0									3 0					41	41	0	0.0	20	44
									1 0										3 0									11	10	1	9.1	5	45
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50					

Marginal Number	SCHOOL	1 Alabama P	F	2 Arizona P	F	3 Arkansas P	F	4 California P	F	5 Colorado P	F	6 Connecticut P	F	7 Delaware P	F	8 Dist. of Columbia P	F	9 Florida P	F	10 Georgia P	F	11 Idaho P	F	12 Illinois P	F	13 Indiana P	F	14 Iowa P	F	15 Kansas P	F	16 Kentucky P	F	17 Louisiana P	F	18 Maine P	F	19 Maryland P	F	20 Massachusetts P	F	21 Michigan P	F	22 Minnesota P	F
	NORTH CAROLINA																																												
46	Duke University School of Medicine, Durham	1	0					1	0									6	1	6	0			1	0	2	0					1	0	6	0			1	0						
47	Bowman Gray School of Medicine of Wake Forest College, Winston-Salem																	4	3																									1	0
48	Univ. of North Carolina School of Med., Chapel Hill																	5	0																										
	OHIO																																												
49	University of Cincinnati College of Medicine							1	0			1	0					10	3					1	0																				
50	Western Reserve University School of Med., Cleveland																	9	1																									1	0
51	Ohio State University College of Medicine, Columbus																	6	3																									1	0
	OKLAHOMA																																												
52	Univ. of Oklahoma School of Med., Oklahoma City									1	0							3	1													8	0												
	OREGON																																												
53	University of Oregon Medical School, Portland							6	0													1	0					1	0													5	0		
	PENNSYLVANIA																																												
54	Hahnemann Med. Coll. and Hospital of Philadelphia							0	1									10	3							1	0									2	0	3	0	0	1	1	0		
55	Jefferson Medical College of Philadelphia							2	0	1	0	2	0	5	0			8	2	2	0	1	0	2	1									1	0			1	0	5	0	1	0	1	0
56	Temple University School of Medicine, Philadelphia							3	0	2	0	1	0	2	0			8	3	1	0			2	0	2	0							5	0			1	0			1	0		
57	Univ. of Pennsylvania School of Med., Philadelphia							2	0					3	0			9	5									1	0	1	0			3	0			1	0			1	0	1	0
58	Woman's Medical Coll. of Pennsylvania, Philadelphia							6	0									0	1	1	0			2	0									1	0			3	0			2	0		
59	University of Pittsburgh School of Medicine							6	0									3	1	1	0			3	1																	1	0		
	SOUTH CAROLINA																																												
60	Medical College of South Carolina, Charleston													1	0			3	1																									1	0
	TENNESSEE																																												
61	University of Tennessee College of Med., Memphis											1	1					13	2					1	0																			3	0
62	Meharry Medical College, Nashville							1	1			0	1							11	0			2	1	1	0					12	0					7	0			1	0		
63	Vanderbilt University School of Medicine, Nashville									1	0							16	6					1	0					1	0			2	0										
	TEXAS																																												
64	Southwestern Medical School of the University of Texas, Dallas							1	0									2	1																					1	0					2	0
65	University of Texas School of Medicine, Galveston							1	0									4	1															2	0										
66	Baylor University College of Medicine, Houston																	2	0					1	0							1	0	2	0							1	0	1	0
	UTAH																																												
67	Univ. of Utah School of Medicine, Salt Lake City							4	0													3	0					1	0													1	0		
	VERMONT																																												
68	University of Vermont College of Med., Burlington											3	0					2	2																	1	0								
	VIRGINIA																																												
69	Univ. of Virginia School of Medicine, Charlottesville																	2	1					0	1									3	0							1	0		
70	Medical College of Virginia, Richmond							1	0	1	0							12	2	2	0					2	0					1	0	1	0								
	WASHINGTON																																												
71	University of Washington School of Med., Seattle							9	0															1	0			1	0					2	0	1	0					1	0		
	WISCONSIN																																												
72	University of Wisconsin Medical School, Madison			1	0			9	0									1	0					5	0	1	0															2	0		
73	Marquette University School of Medicine, Milwaukee							5	0	1	0							3	3	1	0			3	1	1	0			1	0					1	0			9	0	7	0		
	PUERTO RICO																																												
74	Univ. of Puerto Rico School of Medicine, San Juan																																												
	CANADA																																												
75	University of Alberta Faculty of Med., Edmonton											1	0					1	0																							1	0	3	0
76	University of British Columbia Faculty of Medicine, Vancouver																																												
77	University of Manitoba Faculty of Med., Winnipeg	1	0					3	0									1	0	1	0			0	1																	4	0		
78	Dalhousie University Faculty of Medicine, Halifax											0	1					1	0																			2	0					3	0
79	Queen's University Faculty of Medicine, Kingston							1	0																											1	0					2	0		
80	University of Ottawa Faculty of Medicine							3	0							1	0																									1	0		
81	Univ. of Western Ontario Faculty of Med., London																																								2	0	1	0		
82	University of Toronto Faculty of Medicine							1	0									1	1					2	0									3	0			2	0	2	0	4	0		
83	McGill University Faculty of Medicine, Montreal			1	0	5	0			1	0							4	1													1	0			3	0	1	0	1	0	2	0	2	0
84	University of Montreal Faculty of Medicine							1	0			1	1																													1	0		
85	Laval University Faculty of Medicine, Quebec																																								1	0			2	0
	OTHERS																																												
86	Foreign medical faculties	2	0					83	73	1	0	13	17	1	0	6	0	13	11	6	0			216	219	20	6	5	3	1	0			3	0	16	18	44	20	7	14	25	0	17	1
87	Extinct medical schools																	6	0																										
88	Unapproved medical schools																	8	9	2	0																			5	28				
89	Schools of osteopathy									3	0	3	3	0	1											2	1													1	2				
90	**TOTALS**	62		7		71		594		101		65		18		11		613		191		5		738		200		126		122		107		270		48		284		89		300		259	
91	Totals—Examined—Passed	62		6		71		515		101		41		17		11		454		191		5		495		193		123		122		107		270		30		261		43		300		258	
92	Totals—Examined—Failed	0		1		0		79		0		24		1		0		159		0		0		243		7		3		0		0		0		18		23		46		0		1	
93	Percentage failed	0.0		14.3		0.0		13.3		0.0		36.9		5.6		0.0		25.7		0.0		0.0		32.9		3.5		2.4		0.0		0.0		0.0		37.5		8.1		51.6		0.0		0.4	
		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22	

P—Passed; F—Failed.

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						
Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska, Hawaii, and Puerto Rico	Totals	Examined—Passed	Examined—Failed	Percentage Failed	No. Boards Examined by	Marginal Number
P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F						
									70 0		1 0					3 0			8 0				1 0	1 0			110	109	1	0.9	15	46
									52 1	1 0				1 0														63	59	4	6.3	5	47
									47 0																			52	52	0	0.0	2	48
	1 0							2 1			87 1			1 0											1 0			110	105	5	4.5	9	49
	1 0							8 1			81 0			3 0			1 0								1 0			107	105	2	1.9	8	50
								2 0			37 0														1 0			150	147	3	2.0	5	51
								1 0				65 0													1 0		1 0	81	80	1	1.2	7	52
		1 0						1 0					40 2	1 0							0 1		4 0				3 0	66	63	3	4.6	10	53
								1 0						11 0													1 0	35	30	5	15.9	11	54
5 0						12 0		2	2 3 0		6 0			93 0			1 0					2 0	1 0	4 0			1 0	167	162	5	3.0	24	55
								2	0 2 0	1 0	1 0			12 0					1 0	1 0				2 0	1 0		1 0	55	52	3	5.5	21	56
1 0					1 0	5 0		2	0 4 0					61 0	1 0				2 0				1 0		1 0		1 0	107	102	5	4.9	20	57
						1 0		2	0		2 0			3 0									1 0	1 0				26	25	1	3.9	13	58
	1 0										2 0			75 0										1 0				96	94	2	2.1	10	59
																55 0												61	60	1	1.6	4	60
25 0 1 0									1 0					1 0				143 0									1 0	193	190	3	1.6	10	61
2 0 4 0						3 0		6	8 3 0		1 0			3 0		5 0		7 0										80	69	11	13.7	17	62
1 0 1 0									1 0									56 0										86	80	6	7.0	9	63
2 0																		1 0	93 20								1 0	122	101	21	17.2	7	64
																			130 11									149	137	12	8.1	4	65
3 0																			75 6				1 0					93	87	6	6.5	9	66
	1 0							1	0		1 0							14 0				3 0			1 0		31	31	0	0.0	11	67
					1 1 1 0						1 0			1 0							7 2						1 0	23	18	5	21.8	9	68
							1 0				1 0											70 0						80	78	2	2.5	7	69
									4 0							1 0						80 0		7 0			1 0	115	113	2	1.7	12	70
	2 0										3 0		1 0				1 0			1 0			37 0					60	60	0	0.0	12	71
	1 0 1 0							1	0 1 0		1 0		3 0						1 0			1 0	1 0	53	1	1 0	85	84	1	1.2	17	72
								0	1	1 0 1 0									1 1					1 0	53 0	1 0	2 0	98	92	6	6.1	18	73
																												0	0	0	0.0	0	74
										1 0																		7	7	0	0.0	5	75
																									1 0			0	0	0	0.0	0	76
										5 0	1 0														1 0			18	17	1	5.6	9	77
									1 0																1 0			9	8	1	11.1	6	78
								1	0		1 0			1 0					1 0									7	7	0	0.0	6	79
																												5	5	0	0.0	3	80
																												6	6	0	0.0	5	81
								1	0					1 0									1 0					24	23	1	4.2	12	82
											1 0			3 0					1 0									35	34	1	2.9	16	83
					2 0				2 0 1 0	2 0				5 0							1 0							9	8	1	11.1	6	84
						1 0									3 0										1 0			6	5	1	16.7	5	85
					0 1 1 0																1 0												
1 0 4 0					4 1	19 0	3 0	184	229	8 0	0 2	117	58			12 0	34	8		2 2	1 0	14	6		23 7	5 0	1 0	3 1	29 3	1,642	943	699	42.6	38	86
																											2 0	59	21	38	64.4	6	88
						1 0		3	1																			6	6	0	0.0	1	87
						7 0		44	16		81	4					1 0		46	11					7	1		234	195	39	16.6	11	89
80	244	7	102	0	15	56	6	594	229	26	630	66	54	305	49	73	20	214	462	19	12	188	76	22	159	5	72	8,006	...	..	....	..	90
80	244	7	102	0	12	56	6	319	228	24	567	66	52	305	41	73	18	214	407	19	9	181	76	21	156	5	69	...	7,033	..	....	..	91
0	0	0	0	0	3	0	0	275	1	2	63	0	2	0	8	0	2	0	55	0	3	7	0	1	3	0	3	...	...	1,033	....	..	92
0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	46.2	0.4	7.7	10.0	0.0	3.7	0.0	16.3	0.0	10.0	0.0	11.9	0.0	25.0	3.7	0.0	4.5	1.9	0.0	4.2	...	...	..	12.7	..	93
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						

the 15,029 licenses issued, 6,827 were granted after written examination and 8,202 by reciprocity and endorsement of state licenses or the certificate of the National Board of Medical Examiners.

Physicians certified in a given year after written examination were not in all instances tested in that year. The licensing boards of 27 states, the District of Columbia, Alaska, Canal Zone, Hawaii, Puerto Rico, and the Virgin Islands require a year of internship for licensure. The candidate for medical licensure in some of these states is permitted to write the examination before or while serving an internship, and, if he is successful, the license is issued on completion of the internship. Licenses are withheld in some states for other technicalities. In general, also, the licenses of physicians examined in December are dated and issued in the early part of the following year. Table 1, therefore, includes some data on physicians who were examined in 1953 and a few in previous years. The figures presented in this table will not correspond with succeeding tables that deal entirely with physicians examined for licensure within the year 1954. In

TABLE 3.—*Licenses Issued, 1935-1954*

Year	Examination	Reciprocity and Endorsement	Total
1935	5,725	2,194	7,919
1936	6,276	2,773	9,049
1937	6,629	3,205	9,834
1938	6,557	2,956	9,513
1939	6,400	2,872	9,272
1940	6,289	2,866	9,155
1941	6,057	2,762	8,819
1942	6,152	2,469	8,621
1943	6,062	2,340	8,402
1944	7,080	2,596	9,676
1945	5,580	3,622	9,202
1946	6,567	9,669	16,236
1947	6,763	7,701	14,464
1948	5,997	7,595	13,592
1949	5,252	6,929	12,181
1950	5,454	6,755	12,209
1951	5,713	6,225	11,938
1952	6,212	7,016	13,228
1953	6,565	7,869	14,434
1954	6,827	8,202	15,029
Totals	124,157	98,616	222,773

tables 11, 12, and 13 can be noted the number who secured their first license in 1954 and who thus represent additions to the medical profession in the United States and its territories and outlying possessions.

Of the 15,029 licenses to practice medicine and surgery issued in 1954, both by examination and by reciprocity and endorsement of credentials, the greatest number (1,975) were issued in California. New York licensed 1,498 physicians, while more than 500 were registered in Illinois, Ohio, Pennsylvania, and Texas. Delaware, Idaho, Nevada, North Dakota, South Dakota, Vermont, and Wyoming issued less than 50. The fewest (24) were licensed in Wyoming. Among the territories and possessions, Puerto Rico licensed 82, Hawaii 19, Alaska 15, the Canal Zone 12, and Guam 2. None were licensed for private practice in the Virgin Islands. The increase in the number of licenses issued last year as compared with 1953 totaled 595, representing an increase of 262 by written examination and 333 by endorsement of credentials.

Totals of the physicians licensed for 19 previous years and for 1954, both by examination and reciprocity or endorsement, are included in table 3. The variations shown for the years from 1936 to 1941, inclusive, were due to the increase in the licensure of foreign-trained physicians. The increases in 1946 and the succeeding years were the result of the increase in the production of physicians under the accelerated program in medical schools (a wartime measure), the mobility of physicians, and also the licensure of foreign-trained physicians. In the 20 year period from 1935 to 1954, 222,773 medical licenses have been issued, 124,157 after written examination and 98,616 by endorsement of credentials.

Candidates Examined

In table 2 are recorded data referring to applicants for medical licensure by 52 licensing boards.[1] For each board the number who passed and failed are given, the medical school of graduation, the percentage of failures for each school as well as each licensing board, and the number of states in which graduates of a given school were examined. Approved medical schools in the United States that are no longer in existence, foreign faculties of medicine, unapproved medical schools, and schools of osteopathy are not listed by name; but the numbers examined in these three categories are included following those for existing medical schools in the United States and Canada.

Throughout the last calendar year 8,066 candidates were examined, of whom 7,033 passed and 1,033 failed. The candidates represented graduates of 73 existing approved medical schools of the United States, 11 approved medical schools of Canada, one approved medical school in the United States no longer in operation, 184 faculties of medicine, and 2 licensing corporations of other countries, 5 unapproved medical schools in the United States that are no longer in operation or have been given an approved status, and 7 schools of osteopathy. Osteopaths who were granted the legal right to practice medicine, surgery, or both by the medical examining boards are included in these statistics. Osteopaths in other states who were granted the privilege of special practice by other than medical examining boards are excluded from these compilations.

Examination and reciprocity meetings are scheduled at frequent intervals by licensing boards in most of the states to facilitate licensure and to enable physicians to commence practice without undue delay. Later in this study a tabulation is included giving the schedules for all states. The publication of the dates for examinations and reciprocity or endorsement meetings is a regular biweekly feature of THE JOURNAL.

Represented among the 8,066 examinees were 5,999 graduates of approved medical schools in the United States, of whom 4.2% failed; 126 graduates of approved schools in Canada, with 4.8% failures; 6 who were graduates from approved medical schools no longer operating, with no failures; 1,642 graduates of faculties of medicine located in countries other than the United States and Canada, 42.6% of whom failed; 59 graduates of unapproved medical schools at one time in existence in the United States, with 64.4% failures; and 234 graduates of schools of osteopathy, with 16.6% failures.

As in table 1, the 8,066 examinees do not represent an equal number of persons, since a candidate tested in more than one state in a calendar year is counted in

1. Forty-eight state boards, the District of Columbia, Alaska, Hawaii, and Puerto Rico.

each state. If a candidate failed more than once in a given state within the year, however, he is counted in that state as an individual or a single failure. Figures that show the number of individual licentiates added to the medical profession in 1954 are given in tables 11, 12 and 13.

The greatest number of graduates of any one school examined was 207, representing a state university, the University of Illinois College of Medicine. Of the graduates of this school, 111 were tested in Illinois and 96 in 24 other states. The greatest number examined from a private school was 175, representing Tulane University School of Medicine; they were tested in 10 states, including 109 who were examined in Louisiana, where the school is located. Twenty-six schools had more than 100 of their graduates examined for medical licensure in 1954 as follows:

State and Municipal Schools	No. of Examinees	No. of States in Which Examinations Were Taken
University of Illinois	207	25
Indiana University	161	10
State University of Iowa	121	13
University of Kansas	115	4
University of Louisville	110	7
Louisiana State University	110	4
University of Maryland	116	12
University of Michigan	176	13
University of Minnesota	154	8
University of Nebraska	112	9
University of Cincinnati	110	9
Ohio State University	150	5
University of Tennessee	193	10
Southwestern Medical School	122	7
University of Texas	149	4
Medical College of Virginia	115	12
Private Medical Schools		
College of Medical Evangelists	105	20
Emory University	111	6
Northwestern University	116	15
Tulane University	175	10
St. Louis University	157	11
Washington University	104	8
Duke University	110	15
Western Reserve University	107	8
Jefferson Medical College	167	24
University of Pennsylvania	107	20

Albany Medical College with five examinees, had the fewest number of applicants for medical licensure by written examination before state boards. The majority of the graduates of this school are licensed by endorsement of the certificate of the National Board of Medical Examiners. This is also true of other schools with small numbers of examinees.

The following 13 approved schools in the United States had no failures among their graduates in medical licensing examinations last year:

	No. of Graduates Examined	No. of States in Which Examinations Were Taken
University of Southern California	74	6
Stanford University	56	3
University of Colorado	89	9
Georgetown University	19	8
Chicago Medical School	11	7
State University of Iowa	121	13
Wayne University	71	5
Albany Medical College	5	3
University of Buffalo	10	7
University of Rochester	41	20
University of North Carolina	52	2
University of Utah	31	11
University of Washington	60	12

Thirty-four schools had less than 5% and 15 between 5 and 10% failures among their graduates. There were 11 schools with 10% or more failures in state examinations. The over-all figures and percentages for failures are modified when included with the results of the final examinations of the National Board of Medical Examiners (see table 6).

There were 126 graduates of 11 approved medical schools in Canada tested for medical licensure in 1954 by 28 boards. The figures are given for each licensing board by school in table 2 and numbers examined by each board in table 4. Of the 126 candidates examined, 120 passed and 6, or 4.8%, failed.

TABLE 4.—*Graduates of Medical Schools in Canada Examined for Licensure in the United States, 1954*

	Examined	Passed	Failed
Alabama	1	1	0
Arkansas	1	1	0
California	14	14	0
Connecticut	5	3	2
District of Columbia	1	1	0
Florida	10	8	2
Georgia	1	1	0
Illinois	3	2	1
Kentucky	1	1	0
Louisiana	4	4	0
Maine	5	5	0
Maryland	3	3	0
Massachusetts	4	4	0
Michigan	7	7	0
Minnesota	23	23	0
New Hampshire	3	2	1
New Jersey	2	2	0
New York	2	2	0
North Carolina	3	3	0
North Dakota	7	7	0
Ohio	4	4	0
Pennsylvania	10	10	0
Rhode Island	3	3	0
Texas	2	2	0
Vermont	2	2	0
Virginia	1	1	0
Washington	2	2	0
Wisconsin	2	2	0
Totals	126	120	6

Six graduates of one approved medical school no longer in operation were tested in one state. None failed. Graduates of five unapproved medical schools were examined in 6 states and graduates of seven schools of osteopathy in 10 states. Represented were 59 graduates of unapproved schools, of whom 21 passed and 38, or 64.4%, failed, and 234 osteopathic graduates, of whom 195 passed and 39, or 16.6% failed. Graduates of foreign faculties of medicine were examined by 38 boards. There were 1,642 such graduates, with 699, or 42.6%, failures. The University of Puerto Rico School of Medicine, an approved school, had none of its graduates licensed in the United States in 1954.

TABLE 5.—*Source of Candidates Examined for Licensure in the United States, 1954*

Medical Schools	No. of Schools	No. Examined	No. Passed	No. Failed	Percentage Failed
Approved schools in United States	73	5,999	5,748	251	4.2
Approved in Canada	11	126	120	6	4.8
Extinct	1	6	6	0	0.0
Foreign	186	1,642	943	699	42.6
Unapproved schools	5	59	21	38	64.4
Schools of osteopathy	7	234	195	39	16.6
Totals		8,066	7,033	1,033	12.7

Totals for the six categories are given in table 5. It will be noted that 4.2% of the graduates of existing approved medical schools in the United States failed and 4.8% of the graduates of Canadian schools. The greatest number of failures fell within three groups: foreign faculties of medicine, unapproved medical schools, and schools of osteopathy. Those in these three groups registered by medical boards are separately discussed in later tables.

TABLE 6.—*Combined Results of Examinations of State Boards and the National Board of Medical Examiners, 1954*

School	Results by Medical Examining Board Tests		Part 3 Examination of National Board of Medical Examiners		Total Examined	Totals		Percentage Failed
	P	F	P	F		P	F	
Medical College of Alabama...	65	3	2	0	70	67	3	4.3
University of Arkansas.....	72	4	0	0	76	72	4	5.3
College of Medical Evangelists	101	4	26	0	131	127	4	3.1
Univ. of Southern California.	74	0	4	0	78	78	0	0.0
Stanford University	56	0	7	0	63	63	0	0.0
University of California.....	77	1	0	0	78	77	1	1.3
University of Colorado.....	89	0	0	0	89	89	0	0.0
Yale University	15	1	60	2	78	75	3	3.8
Georgetown University	19	0	95	0	114	114	0	0.0
George Washington University	28	3	83	4	118	111	7	5.9
Howard University	69	4	17	2	92	86	6	6.5
Emory University	102	9	4	0	115	106	9	7.8
Medical College of Georgia...	85	11	1	0	97	86	11	11.3
Chicago Medical School.....	11	0	67	0	78	78	0	0.0
Northwestern University	111	5	49	3	168	160	8	4.8
Stritch School of Medicine....	88	3	8	0	99	96	3	6.1
University of Chicago.....	50	2	20	1	73	70	3	4.1
University of Illinois.....	191	16	16	1	224	207	17	7.5
Indiana University	158	3	0	0	161	158	3	1.9
State University of Iowa.....	121	0	11	0	132	132	0	0.0
University of Kansas.....	112	3	2	0	117	114	3	2.6
University of Louisville.....	104	6	2	0	112	106	6	5.4
Louisiana State University...	109	1	0	0	110	109	1	0.9
Tulane University	168	7	2	1	178	170	8	4.5
Johns Hopkins University....	89	3	8	0	100	97	3	3.0
University of Maryland.....	113	3	2	0	118	115	3	2.5
Boston University	6	3	65	3	77	71	6	7.8
Harvard Medical School.....	61	2	125	5	193	186	7	3.6
Tufts College Medical School.	16	4	102	7	129	118	11	8.5
University of Michigan.....	174	2	1	1	178	175	3	1.7
Wayne University	71	0	0	0	71	71	0	0.0
University of Minnesota.....	151	3	16	0	170	167	3	1.8
St. Louis University.....	153	4	6	0	163	159	4	2.5
Washington University	102	2	8	0	112	110	2	1.8
Creighton University	61	2	3	0	66	64	2	3.0
University of Nebraska.....	109	3	5	0	117	114	3	2.6
Albany Medical College.....	5	0	50	2	57	55	2	3.5
State Univ. of N. Y., Brooklyn	24	4	143	1	172	167	5	2.9
University of Buffalo.....	10	0	60	2	72	70	2	2.8
Columbia University	30	2	106	2	140	136	4	2.9
Cornell University	24	3	84	1	112	108	4	3.6
New York Medical College....	16	4	114	10	144	130	14	9.7
New York University.....	22	4	113	5	144	135	9	6.3
University of Rochester.....	41	0	47	0	88	88	0	0.0
State Univ. of N. Y., Syracuse	10	1	57	0	68	67	1	1.5
University of North Carolina.	52	0	0	0	52	52	0	0.0
Duke University	109	1	31	0	141	140	1	0.7
Bowman-Gray School of Med.	59	4	0	0	63	59	4	6.3
University of Cincinnati.....	105	5	3	0	113	108	5	4.4
Western Reserve University...	105	2	1	0	108	106	2	1.9
Ohio State University.....	147	3	13	1	164	160	4	2.4
University of Oklahoma.....	80	1	1	0	82	81	1	1.2
University of Oregon.....	63	3	4	0	70	67	3	4.3
Hahnemann Medical College..	30	5	80	1	116	110	6	5.2
Jefferson Medical College.....	162	5	26	0	193	188	5	2.6
Temple University	52	3	105	4	164	157	7	4.3
University of Pennsylvania...	102	5	27	0	134	129	5	3.7
Woman's Med. Coll., Penna..	25	1	29	2	57	54	3	5.3
University of Pittsburgh.....	94	2	4	0	100	98	2	2.0
Med. Coll. of South Carolina.	60	1	0	0	61	60	1	1.6
University of Tennessee.....	190	3	2	0	195	192	3	1.5
Meharry Medical College.....	69	11	5	1	86	74	12	13.9
Vanderbilt University	80	6	0	0	86	80	6	7.0
Southwestern Medical School.	101	21	0	0	122	101	21	17.2
University of Texas.....	137	12	1	0	150	138	12	8.0
Baylor University	87	6	1	0	94	88	6	6.4
University of Utah.....	31	0	1	0	32	32	0	0.0
University of Vermont.....	18	5	24	2	49	42	7	14.3
University of Virginia.....	78	2	2	0	82	80	2	2.4
Medical College of Virginia...	113	2	5	0	120	118	2	1.7
University of Washington....	60	0	1	0	61	61	0	0.0
University of Wisconsin.....	84	1	1	0	86	85	1	1.2
Marquette University	92	6	19	1	118	111	7	5.9
Subtotals: U. S. Schools....	5,748	251	1,977	65	8,041	7,725	316	3.9
University of Alberta.....	7	0	1	0	8	8	0	0.0
University of Manitoba.....	17	1	1	0	19	18	1	5.3
Dalhousie University	8	1	0	0	9	8	1	11.1
Queen's University	7	0	0	0	7	7	0	0.0
University of Ottawa.....	5	0	1	0	6	6	0	0.0
University of Western Ontario	6	0	4	0	10	10	0	0.0
University of Toronto.....	23	1	10	0	34	33	1	2.9
McGill University	34	1	20	0	55	54	1	1.8
University of Montreal.....	8	1	0	0	9	8	1	11.1
Laval University	5	1	0	0	6	5	1	16.7
Subtotals: Canadian Schools	120	6	37	0	163	157	6	3.8
Extinct medical schools.....	6	0	0	0	6	6	0	0.0
Unapproved medical schools..	21	38	0	0	59	21	38	64.4
Osteopathic schools	195	39	0	0	234	195	39	20.0
Foreign medical faculties.....	943	699	38	4	1,684	981	703	41.7
Totals.....	7,033	1,033	2,052	69	10,187	9,085	1,102	10.8

Combined Results of Examinations

The combined results of two groups of examinations, the state medical board examinations and part 3 of the examinations of the National Board of Medical Examiners, are given in table 6. This table represents a comprehensive analysis of the performance of physicians from individual schools. It will be noted that schools having failures before state licensing boards had few, if any, failures before the National Board.

In 1954 there were 5,999 graduates of approved medical schools in the United States examined by state boards, of whom 251, or 4.2%, failed. In the same calendar year, 2,042 graduates of these schools were tested in the final examination of the National Board, of whom 65, or 3.1%, failed. In both groups, a total of 8,041 were examined, of whom 7,725 passed and 316, or 3.9%, failed.

Of the graduates of Canadian medical schools, 4.6% failed state board examinations in the United States and none failed the National Board test. Only 42 graduates of foreign medical schools were examined by the National Board, while 1,642 were examined by state boards. The National Board did not examine in 1954 any graduates of an approved medical school no longer in operation. There were also none examined by the National Board in the unapproved medical school or osteopathic school categories. There is no comparison to be made of these groups.

The total of all candidates examined by state boards was 8,066, of whom 7,033 passed and 1,033, or 12.7%, failed. For both groups—state boards and the National board—10,187 were examined, 9,085 passed, and 1,102, or 10.8%, failed.

Failures in Medical Licensure Examinations

Licensure failures by graduates of approved medical schools in the United States located in the state where examined and in other states for the year 1954 are recorded in table 7. In this compilation the United States is divided into two groups, the 32 states and the District of Columbia in which approved four year medical schools having graduates examined last year are located, and the states, territories, and outlying possessions that had no four year medical school in complete operation in 1954. The figures include the total number examined, the number of licentiates who failed state board examinations and were graduates of a medical school located in the state in which they were examined, and the number of persons failing in a given state who obtained their professional training in schools in other states.

Of the 5,999 candidates for licensure in 1954 who obtained their professional education in the United States, 1.1% failed examinations in the state in which they were trained. This occurred in 10 states. There were 51 failures reported by 8 states among graduates from approved schools located in states other than the one in which they were examined. Twenty-one states had no failures in either group, and four had failures in both.

All but four boards require the applicant to receive a general average of 75% in the medical license examination, two require 80%, and two 70% and 74% respectively. In 17 states, if a candidate fails to make a passing grade in one or more subjects he is not considered a failure but may repeat those subjects in which he failed.

Twenty-four boards have no restrictions on the number of times a candidate who fails may retake the examination, 7 boards specify determination in this regard is left to the discretion of the board, a candidate is allowed three examinations by 6 boards and two examinations by four boards, while 13 boards permit the candidate to repeat one examination. Fifty-two candidates had 3 previous failures before obtaining licensure, 28 had 4 failures, 16 had 5 failures, 12 had 6 failures, 2 had 7 failures, 1 had 9 failures, 2 had 10 failures, 2 had 11 failures, and one each had 12, 19, and 22 failures. With a few exceptions

TABLE 7.—*Licensure Failures by Graduates of Existing Approved Medical Schools in the United States Located in the State Where Examined and Elsewhere, 1954*

States With Four Year Medical Schools	Total No. Examined	No. of Failures of Schools in State	No. of Schools in State Represented at Examinations	Percentage Failed	No. of Failures of Schools Out of State	No. of Schools Out of State Represented at Examinations	Percentage Failed	Percentage Failed in All U. S. Schools
Alabama	59	0	1	0.0	0	4	0.0	0.0
Arkansas	70	0	1	0.0	0	2	0.0	0.0
California	424	1	4	0.4	5	40	1.1	1.4
Colorado	97	0	1	0.0	0	15	0.0	0.0
Connecticut	24	0	0	0.0	2	16	8.3	8.3
District of Columbia	4	0	2	0.0	0	2	0.0	0.0
Georgia	182	0	2	0.0	0	18	0.0	0.0
Illinois	300	10	5	3.3	13	33	4.3	7.6
Indiana	171	0	1	0.0	0	19	0.0	0.0
Iowa	118	0	1	0.0	0	7	0.0	0.0
Kansas	121	0	1	0.0	0	11	0.0	0.0
Kentucky	106	0	1	0.0	0	9	0.0	0.0
Louisiana	263	0	2	0.0	0	28	0.0	0.0
Maryland	217	1	2	0.5	2	21	0.9	1.4
Massachusetts	28	0	1	0.0	2	16	7.1	7.1
Michigan	268	0	2	0.0	0	25	0.0	0.0
Minnesota	218	0	1	0.0	0	35	0.0	0.0
Missouri	240	0	2	0.0	0	19	0.0	0.0
Nebraska	102	0	2	0.0	0	2	0.0	0.0
New York	115	4	7	3.5	25	33	21.7	25.2
North Carolina	218	1	3	0.5	0	22	0.0	0.5
Ohio	306	1	3	0.3	0	28	0.0	0.3
Oklahoma	66	0	1	0.0	0	1	0.0	0.0
Oregon	54	2	1	3.7	0	7	0.0	3.7
Pennsylvania	283	0	6	0.0	0	18	0.0	0.0
South Carolina	73	0	1	0.0	0	10	0.0	0.0
Tennessee	213	0	3	0.0	0	6	0.0	0.0
Texas	383	37	3	9.4	1	17	0.2	9.6
Utah	19	0	1	0.0	0	5	0.0	0.0
Vermont	10	2	1	20.0	1	1	10.0	30.0
Virginia	157	0	2	0.0	0	6	0.0	0.0
Washington	69	0	1	0.0	0	17	0.0	0.0
Wisconsin	145	1	2	0.7	0	20	0.0	0.7
Subtotals	5,183	60	67	1.1	51	513	0.9	2.1
States Without Four Year Medical Schools								
Arizona	7				1	7	14.3	
Delaware	16				0	8	0.0	
Florida	556				137	67	24.6	
Idaho	5				0	3	0.0	
Maine	9				0	7	0.0	
Mississippi	79				0	20	0.0	
Montana	7				0	7	0.0	
New Hampshire	7				1	6	14.3	
New Jersey	27				0	8	0.0	
New Mexico	3				0	2	0.0	
North Dakota	17				0	11	0.0	
Rhode Island	4				0	4	0.0	
South Dakota	15				0	9	0.0	
West Virginia	21				1	9	4.8	
Wyoming	5				0	4	0.0	
Alaska, Hawaii, and Puerto Rico	88				0	30	0.0	
Subtotals	816				140	196	17.1	

these multiple failures represented graduates of foreign medical faculties and unapproved medical schools in the United States. In six states the examination for medical licensure is both written and oral, in three states it is oral, written, and practical, while 45 boards require that the examination be a written test.

In the 15 states, territories, and outlying possessions that do not have medical schools, 4 boards reported 140 failures, or 17.1%. The total number examined in the first group, states in which approved medical schools are located, was 5,183, while in the second group, states that have no approved four year medical school, 816 were examined.

Registration by Reciprocity and Endorsement

A summary of the reciprocity and endorsement policies pertaining to medical licensure is included in table 8. One state, Florida, requires all applicants for licensure to pass a written examination. Hawaii and the Virgin Islands do not have reciprocal relations with any state but will endorse physicians certified by the National Board of Medical Examiners. Eighteen state boards, the District of Columbia, and Alaska require applicants for licensure by both examination and reciprocity to obtain a certificate from the board of examiners in the basic sciences. In the section of this report pertaining to basic science boards is included a table outlining the reciprocity, endorsement, exemption, or waiver policies of these boards.

Twenty-eight states, Alaska, and Puerto Rico have reciprocal agreements with specific states. Twenty-one boards are given discretionary powers under the medical practice acts to endorse applicants. These boards will register physicians who present credentials that correspond with those required by their respective states in the year issued. Seventeen boards that have reciprocal agreements also have similar discretionary powers to endorse applicants from nonreciprocating states. The states in which physicians certified by the National Board of Medical Examiners are accepted for licensure on the basis of the board's certificate are also indicated.

Additional requirements, including professional practice, citizenship, oral examinations, and internship are recorded, as is also the fee for a license without written examination. A few boards will exempt citizens of Canadian birth from the citizenship requirement. This is indicated by a footnote. The majority of the states will not accept graduates of foreign faculties of medicine on a reciprocal basis. Other requirements or exemptions are indicated by footnotes.

This chart will be available in reprint form. It is helpful to physicians who are considering a change in location. The data recorded are intended to be merely a summary of licensure policies. The information here given should be supplemented by direct communication with the licensing boards. A list of the executive officers in charge of medical licensure appears elsewhere in this report.

The procedure in issuing licenses by reciprocity or endorsement varies. Some states consider applications for licensure at any time, while others hold monthly, quarterly, or semiannual meetings. The policy in effect in each state is contained in table 23. In addition, THE JOURNAL publishes biweekly the exact dates when applications are considered.

In table 9 are presented data pertaining to the credentials accepted as the basis for licenses granted without

written examination in 1954. There were 8,202 so registered on the basis of licenses issued by other boards, the certificate of the National Board of Medical Examiners, by special exemption, and by acceptance of service with an agency of the government of the United States. 441. The largest number of candidates presenting the same type of credential were the 3,410 diplomates certified by the National Board of Medical Examiners.

There were 394 licenses that were issued in Illinois, 253 in New York, 255 in Ohio, and 337 in Pennsylvania

TABLE 8.—RECIPROCITY AND ENDORSEMENT

Marginal Number	The Examining Board of	Reciprocates with, or Endorses Certificates Granted by: Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	Marginal Number
1	Alabama	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
2	Arizona	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
3	Arkansas	+	+	..	+	+	+	..	+	..	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+	..	+	+	+	3
4	California	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
5	Colorado	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
6	Connecticut	..	..	..	..	..	..	..	+	..	..	+	..	+	..	+	..	+	+	+	+	+	..	..	..	..	..	..	+	..	..	..	6
7	Delaware	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
8	District of Columbia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8
9	Florida	No reciprocity or endorsement policies																														9
10	Georgia	+	..	+	+	+	..	..	+	..	..	..	+	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	+	10
11	Idaho	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
12	Illinois	+	..	+	+	+	..	..	..	..	+	..	..	+	+	+	..	+	+	..	+	..	+	..	+	+	..	+	+	..	+	..	..	12
13	Indiana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13
14	Iowa	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14
15	Kansas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
16	Kentucky	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16
17	Louisiana	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	17
18	Maine	..	..	+	+	+	+	+	+	..	+	..	..	+	+	+	+	+	..	..	+	+	+	..	+	+	+	+	+	+	+	+	18
19	Maryland	+	..	+	+	..	+	+	+	..	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	19
20	Massachusetts	+	..	..	..	..	+	+	+	..	+	+	..	+	+	+	+	+	+	+	..	..	..	..	+	+	+	..	..	+	+	..	20
21	Michigan	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	21
22	Minnesota	+	+[41]	+	+	+	+[41]	+[41]	+	..	+	+[41]	..	+[41]	+	+[41]	+[41]	+[41]	+	+	+	+[41]	+	..	+	+	+	+	+	+[41]	+	+	22
23	Mississippi	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	23
24	Missouri	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	24
25	Montana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25
26	Nebraska	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	26
27	Nevada	+	..	+	+	+	..	..	+	..	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	..	+	+	+	..	27
28	New Hampshire	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28
29	New Jersey	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	29
30	New Mexico	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	30
31	New York	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31
32	North Carolina	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	32
33	North Dakota	+	..	+	+	+	..	..	..	..	+	..	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	+	33
34	Ohio	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	34
35	Oklahoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35
36	Oregon	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	36
37	Pennsylvania	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	37
38	Rhode Island	..	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	..	+	+	+	+	+	+	38
39	South Carolina	+	..	..	..	..	..	..	+	..	+	..	..	+	..	+	+	+	+	+	..	+	..	+	..	+	+	..	+	..	+	+	..	39
40	South Dakota	+	+	+	+	+	..	..	..	..	+	..	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	..	..	+	40
41	Tennessee	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	41
42	Texas	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	42
43	Utah	+	+	+	+	+	+	+	..	..	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	43
44	Vermont	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	44
45	Virginia	..	..	..	..	..	..	..	..	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13	..	..	..	45
46	Washington	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	46
47	West Virginia	+	..	+	20	20	+	+	+	..	+	..	+	20	20	20	20	+	+	+	20	+	+	+	+	+	+	+	..	+	..	47
48	Wisconsin	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	48
49	Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	49
50	Alaska	+	..	+	+	+	..	+	..	..	..	..	..	+	..	..	+	..	..	+	..	+	+	+	+	..	..	+	+	+	..	..	..	50
51	Guam	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	51
52	Hawaii	No reciprocal relations																														52
53	Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	+	..	..	..	..	..	..	..	..	53
54	Virgin Islands	No reciprocal relations																														54

This summary should be supplemented by direct communication with the

Some states have additional requirements for graduates of schools outside the United States and Canada.

+, indicates reciprocal or endorsement relationships have been established; .. indicates no reciprocal or endorsement relationships have been established. (See column—"At the discretion of the board.")

1. 1st P, first papers required; ⊕, in citizenship column indicates full citizenship required, in other columns it implies a requirement.
2. In most cases there is a small additional recording or registration fee.
3. Year of practice after internship required.
4. Internship accepted in lieu of one year's practice.
5. Professional practice required.
6. All applicants must be graduates of a medical school approved by the American Medical Association.
7. Just preceding application.
8. No basic science reciprocity—examination must be within the state.
9. Basic science certificate required either by reciprocity or examination in addition to basic science subjects of National Board.
10. Canadian citizens are required to file first papers.
11. Not applicable to citizens of Canada.
12. Oral examination required when application is based on a license dated ten or more years prior to filing application.
13. No reciprocity.
14. Oral examination required.
15. Endorsement of National Board of Medical Examiners $35.
16. Actual practice for a period of three years immediately preceding date of application.
17. Practical, clinical examination required.
18. In lieu of its own examination, certificate of National Board may be accepted in whole or in part.
19. Minimum fee.
20. Licentiates of California, Colorado, Indiana, Iowa, Kansas, Massachusetts, and Rhode Island accepted on reciprocal basis at discretion of board.

California issued the greatest number of licenses by this method. In this state 1,468 were registered. New York licensed 1,178. Five other states licensed more than 275, namely, Connecticut, 281, Massachusetts, 398, New Jersey, 329, Ohio, 352, and Pennsylvania, presented to other states for reciprocal registration. Figures for other states were fewer than 250. Sixty-two medical officers of one of the federal services received licenses by endorsement of military credentials in eight states. Eighteen were licensed by 5 boards on the basis of a

license issued in Alaska, Hawaii or Puerto Rico; 31 by 9 boards on the basis of Canadian or foreign credentials; and 19 by 3 boards by special exemption.

In table 10 are recorded the numbers from individual schools represented by the 8,202 reciprocity licentiates. Every approved medical school in the United States and the University of Puerto Rico had graduates licensed without written examination in 1954. All of the approved Canadian schools were so registered with but one exception, the University of British Columbia. The 8,202 licentiates included 7,747 graduates of approved schools in the United States and 106 from Canadian medical schools. Licenses were obtained by 188 foreign-trained physicians in 30 states, and 40 graduates of approved medical schools no longer in operation were registered in 23 states. Thirty-six graduates of unapproved medical schools secured licenses in 9 states, and 85 graduates of schools of osteopathy were registered in 12 states. This table reflects the movement of physicians to states other than the one in which they obtained their professional training or in which they first established their practice.

POLICIES OF MEDICAL LICENSING BOARDS

Marginal Number	Reciprocates with, or Endorses Certificates Granted by: New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska	Puerto Rico	At the Discretion of the Board	National Board of Medical Examiners	Requirements: Basic Science Certificate	Internship	Professional Practice	Citizenship [1]	Fees, Dollars [2]	Miscellaneous	Marginal Number
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+		⊕	1[4]	⊕[11]	50	..	1
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	3[16]	1st P	100	41	2
3	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+			1[4]	⊕	50	42	3
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	0	⊕[21]	100	12	4
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[43]	+[9]	⊕	⊕	..	⊕	50	42	5
6	..	..	..	+	..	..	+	+	..	..	+	+	..	+	..	..	+	..	..	..	..	+	+[5]	⊕		3[16]	1st P[19]	75	18	6
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[27]	⊕[32]	⊕	2	⊕	100	..	7
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[35]			1[18]	..	50	..	8
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9
10	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	..	+[17]	..	..	0	⊕	50	..	10
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	..	⊕	100	..	11
12	..	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	..	..	+[17]	..	⊕	1	1st P	25	17,42	12
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	1[4]	..	100	..	13
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	1[4]	1st P	50	..	14
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	1[4,7]	⊕	50	42	15
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	1[4]	⊕	75	..	16
17	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	..	..	..	..	1[4]	1st P[10,10]	50[28]	42	17
18	..	..	+	+	+	+	+	..	+	..	+	+	+	+	+	..	+	+	+	..	..	+	+	..	..	1[4]	+	50	..	18
19	+	+	..	+	+	+	+	+	..	+	+	..	+	+	+	..	+	+	..	+	+	+	+	..	..	1[4]	1st P	50	42	19
20	+	+	..	+	..	+	+	+	..	+	+	..	+	+	+	..	+	+	..	..	..	+	+	..	..	0	1st P	50	..	20
21	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	⊕[37]	⊕	1[4]	+	100	24	21
22	+[41]	+	..	+[41]	+	+	+	+	+[41]	..	+	+	+	+	+	+	+	+	+	+	+	+	+	⊕	..	0	+	100	33,37,42	22
23	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	..	⊕[11]	50	..	23
24	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+[27]	..	⊕[33]	1[4]	⊕	100	..	24
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	1[4]	⊕	75	18,42	25
26	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	1[4]	⊕	50[29]	..	26
27	+	+	..	+	+	+	+	+	..	+	+	+	+	+	..	+	+	+	..	..	..	+	+	⊕	⊕	1[4]	⊕	200	34,42	27
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	0	⊕[11]	50	..	28
29	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	⊕	0	⊕	100	..	29
30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	⊕	..	1[4]	1st P	50	..	30
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	2	1st P	30	..	31
32	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	0	⊕	100	42,6	32
33	..	+	..	+	+	+	+	..	..	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	⊕	1	⊕[11]	50	18,42	33
34	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			1[4]	⊕	50	..	34
35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕[32]	⊕	1[4]	..	100	11,6	35
36	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+[9,27]	⊕	⊕	..	⊕	100	6,42	36
37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[35]	⊕	⊕	2[24]	1st P	50	42	37
38	..	+	..	+	+	..	+	..	..	..	+	..	..	+	..	+	+	+	+	..	..	+[14]	+[14]	⊕	⊕	0	1st P	20	14	38
39	..	+	..	+	+	+	+	..	..	..	+	+	..	+	..	+	+	+	+	..	+	..	+	⊕	⊕	1[4]	⊕	50	42	39
40	..	+	+	+	+	+	..	..	+	..	+	+	+	+	+	+	+	+	+	..	..	..	+	⊕	⊕	1	1st P	50	..	40
41	+	+	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	..	..	+	+[30]	..	..	0	⊕	50	42	41
42	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	..	..	0	..	100	..	42
43	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	+	..	⊕	31	..	50	42	43
44	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[22]	..	⊕	1[18]	⊕	50	11	44
45	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	[18]	..	..	..	..	..	+[39]	+	..	..	2[26]	1st P	100	..	45
46	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	0	..	25	..	46
47	..	+	+	+	+	+	+	[20]	+	+	+	+	+	+	+	..	..	+	+	+	..	..	+	⊕	⊕	0	⊕	100	..	47
48	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	..	+[14]	+[18]	⊕	⊕	1[29]	1st P	75[19]	6	48
49	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	+[14]	⊕	⊕	0	⊕	50	..	49
50	..	+	+	+	+	+	..	..	..	..	+	+	+	+	+	+	+	+	+	..	..	..	+	⊕	⊕	0	⊕	100	6	50
51	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	0	..	50	6	51
52	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	⊕	..	⊕	25	42,6	52
53	..	..	+	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	+	..	..	+[8,39]	+	..	⊕	1[18]	⊕	30	..	53
54	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	⊕	..	..	65	42	54

secretary of the licensing board of the state in which the physician is interested.

21. Not required if country in which applicant is licensed will admit to practice citizens of the United States licensed to practice in some state or on proof of requirements similar to those required by California for graduates of foreign medical schools.
22. Fee $20.
23. Oral examination required if applicant's state requires it.
24. If the applicant passes the examination in the state from which he transfers after the completion of his internship, no practice is required.
26. Internship accepted at the discretion of the board as the equivalent of two years' practice.
27. Fee, $25.
28. Fee same as applicant's state charges but not less than $50.
29. A two year internship or a year of residency is accepted.
30. Diplomates of National Board not required to have been in practice for three years.
31. Same as required of candidates of state applying for licensure.
32. Not required for licensure by reciprocity.
33. Reciprocity applicants only.
34. Supplemental examination required in certain cases when accepting the examination of a state with whom reciprocal relations have not been established.
35. Applicants issued certificates prior to October, 1953, acceptable.
36. Fee same as applicant's state charges but not less than $75.
37. For matriculants after Oct. 15, 1937.
38. Applicants issued certificates prior to Sept. 1, 1954, acceptable.
39. Reciprocity extended at discretion of board to candidates whose qualifications would entitle them to admission to examination and who took examination equivalent to that required by this board.
40. Permanent license withheld until completion of citizenship.
41. At the discretion of the board.
42. Graduates of foreign medical schools are not accepted for licensure by reciprocity.
43. Reciprocity extended at discretion of board to states having comparable licensing requirements and which accept Colorado applicants on a substantially equal reciprocal basis.

TABLE 9.—CANDIDATES LICENSED BY RECIPROCITY AND ENDORSEMENT OF CREDENTIALS, 1954

Source of Former License or Credentials

States Issuing Licenses by Reciprocity or Endorsement	Total Licensed	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	U.S. Govt. Services	National Board of Medical Examiners	Alaska, Hawaii, Puerto Rico	Canadian, Foreign	Special Exemption
Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
Alabama	88	..	..	2	1	1	1	..	..	..	11	..	4	..	..	2	2	14	..	4	..	..	1	3	1	..	..	..	..	..	..	..	2	..	1	..	..	2	..	1	..	7	2	..	..	..	..	..	..	..	2	24	..	..	..
Arizona	79	1	..	..	8	7	..	..	..	1	1	..	3	5	6	1	..	1	..	..	..	2	4	..	3	..	1	..	..	1	..	2	..	..	6	3	..	3	..	..	..	2	3	..	1	..	..	..	1	..	..	12	..	1	..
Arkansas	38	1	..	..	1	1	..	..	..	..	..	..	1	..	..	1	1	7	..	..	..	..	1	4	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	11	5	..	..	1	..	..	..	..	..	..	..	1	..
California	1,468	2	4	10	..	14	4	..	7	5	7	1	145	36	39	22	22	26	2	23	3	62	95	5	57	1	31	1	1	10	..	32	9	2	61	10	19	69	2	2	4	29	38	12	2	21	14	7	29	2	29	434	5	..	1
Colorado	136	..	2	1	2	..	..	..	..	..	1	..	9	3	5	4	2	4	..	1	..	6	7	..	21	..	10	..	..	1	1	1	1	..	7	2	..	3	..	..	..	3	8	1	..	..	..	..	2	..	..	28	..	..	..
Connecticut	281	..	..	..	4	1	..	..	2	..	1	..	3	3	..	4	2	4	1	8	4	5	1	..	3	..	2	..	1	1	..	36	2	..	3	..	..	2	3	2	1	2	..	..	3	4	..	..	..	..	..	173	..	..	..
Delaware	21	..	..	..	..	..	1	..	1	..	..	..	2	..	..	..	..	1	..	2	1	..	1	..	..	..	..	..	..	2	..	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	1	..	..	..	..	3	..	..	..
Dist. of Columbia	138	..	..	..	2	..	..	..	..	..	3	..	3	..	..	..	1	1	..	11	..	1	1	..	2	..	1	..	..	..	..	7	1	..	3	..	..	6	1	1	..	2	2	..	1	4	..	..	3	..	..	76	..	5	..
Florida	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Georgia	96	1	..	2	..	..	..	..	1	..	..	..	3	..	2	2	4	6	..	6	..	2	..	3	1	..	1	..	..	1	..	..	7	..	5	..	..	3	1	5	..	17	2	..	..	3	..	1	..	..	..	17	..	..	..
Idaho	39	..	..	..	6	4	..	..	..	..	1	..	..	..	1	1	..	..	..	..	..	2	1	..	6	..	2	..	..	..	..	1	..	..	5	..	3	..	..	1	..	..	1	1	..	..	1	..	..	..	..	2	..	..	..
Illinois	184	..	..	..	6	..	..	..	..	..	..	..	..	11	6	1	1	3	..	1	..	6	..	..	13	..	3	..	..	2	..	10	1	..	9	1	..	2	..	1	..	5	3	..	..	1	..	..	9	..	2	87	..	..	..
Indiana	178	1	..	1	6	3	1	1	1	1	1	..	32	..	2	4	11	..	2	5	..	7	7	1	20	..	2	..	1	..	..	6	3	1	20	2	..	8	1	2	..	3	4	1	..	1	2	2	7	..	..	..	..	5	..
Iowa	90	..	..	..	6	3	1	..	..	..	..	..	10	2	..	3	..	1	1	2	..	..	3	..	7	..	13	..	..	..	..	1	..	..	3	..	..	..	..	..	1	1	1	..	..	..	1	..	2	..	..	28	..	..	..
Kansas	76	..	..	..	..	2	1	..	..	..	2	..	5	1	2	..	1	3	..	..	..	4	..	..	9	..	5	..	..	..	..	1	..	..	1	2	..	5	..	..	1	5	2	..	..	3	1	..	1	..	..	19	..	..	..
Kentucky	90	1	..	2	2	..	..	..	1	..	3	..	4	1	2	..	..	1	..	3	..	2	1	1	1	..	1	..	..	2	..	2	1	..	11	1	..	3	..	3	..	10	..	..	..	3	..	3	..	..	..	25	..	..	..
Louisiana	142	4	..	11	4	1	..	..	..	..	9	..	4	4	2	5	1	..	..	4	..	..	..	23	3	..	4	..	..	..	..	..	8	..	8	4	..	5	..	2	..	19	11	..	..	2	..	..	4	..	..	..	..	..	..
Maine	54	..	..	..	3	..	1	..	..	..	..	..	..	2	..	1	..	..	..	1	2	2	1	..	1	..	..	..	1	1	..	..	..	..	3	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	33	..	..	..
Maryland	206	1	..	2	5	1	..	..	19	..	2	..	4	3	2	2	..	3	..	..	2	3	2	..	8	..	..	..	..	1	..	5	2	..	2	1	..	15	..	..	..	4	4	..	..	7	..	1	3	..	..	102	..	..	..
Massachusetts	398	2	..	..	..	..	7	..	..	..	2	..	..	2	..	1	2	..	5	5	..	..	..	..	7	..	..	..	..	1	..	6	1	..	5	..	..	10	4	..	..	3	3	1	2	6	..	1	..	..	..	322	..	..	..
Michigan	207	..	..	..	4	2	..	..	2	..	1	..	15	5	4	3	6	4	..	6	1	7	7	..	4	..	7	..	..	2	..	7	..	..	24	2	1	6	..	2	..	6	7	..	1	..	..	1	1	..	..	69	..	..	..
Minnesota	150	1	..	3	12	3	..	..	..	..	..	..	..	7	7	3	1	5	..	3	..	..	..	..	5	..	3	..	..	..	..	..	1	..	4	1	..	9	..	..	2	..	2	..	..	5	1	..	7	..	..	65	..	..	..
Mississippi	41	2	..	2	..	1	..	..	..	..	..	..	1	..	..	..	2	12	..	1	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	..	2	..	2	..	6	1	..	..	..	..	..	..	..	..	4	..	2	..
Missouri	163	2	..	16	5	2	..	..	..	..	5	..	10	3	6	34	3	4	..	2	..	5	2	1	..	..	3	..	..	..	..	1	3	..	2	1	3	..	..	..	5	3	..	..	2	..	..	2	..	..	38	..	..	..
Montana	52	..	..	..	3	3	..	..	..	..	1	..	4	..	3	3	..	1	..	1	..	..	4	..	2	..	2	..	..	..	..	..	1	1	3	..	1	3	..	..	1	..	1	..	..	1	3	..	..	..	..	10	..	..	..
Nebraska	32	..	..	1	3	1	..	..	..	..	..	..	3	2	4	3	..	2	..	..	..	1	3	..	..	..	..	..	..	..	..	1	1	..	..	1	..	1	..	..	2	1	2	..	..	..	..	..	..	..	..	..	..	..	..
Nevada	36	..	..	..	11	..	..	..	..	..	..	..	2	1	2	1	..	2	..	2	..	..	1	..	1	..	1	..	..	1	..	1	1	..	2	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	5	..	..	..
New Hampshire	43	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	2	1	5	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	1	..	..	5	1	..	..	..	..	22	1	1	..
New Jersey	329	1	..	..	..	..	1	1	..	..	..	..	6	4	2	1	1	2	..	15	..	3	1	..	5	..	..	..	..	..	..	68	1	..	4	..	..	42	..	1	..	2	1	2	..	1	..	1	1	..	..	162	..	..	..
New Mexico	51	..	2	..	5	4	..	..	..	..	..	..	5	1	1	..	1	2	..	..	..	1	3	..	1	1	..	..	..	..	..	3	..	..	1	2	..	4	..	..	..	2	8	1	..	2	..	..	1	..	..	..	..	..
New York	1,178	2	..	..	26	3	..	..	1	..	1	..	2	4	3	..	5	13	..	19	2	10	6	1	..	..	3	..	..	12	..	..	8	..	..	1	..	42	..	..	..	5	6	1	3	15	4	2	6	..	..	954	8	10	..
North Carolina	95	..	1	..	4	..	..	..	..	..	9	..	2	3	1	..	2	6	1	6	..	4	1	..	3	1	..	1	2	..	..	1	..	..	2	1	..	8	..	7	..	5	3	..	..	14	1	2	..	..	..	4	..	..	..
North Dakota	19	..	..	..	..	1	..	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	2	..	..	..	..	1	..	..	1	..	..	2	..	..	6	..	..	..
Ohio	352	1	..	..	6	1	..	1	1	..	3	..	33	16	9	2	10	4	..	21	1	10	1	2	23	..	5	..	..	4	..	21	..	1	..	..	..	37	5	2	..	9	1	..	1	13	..	6	7	..	..	95	..	..	..
Oklahoma	64	1	..	6	2	2	..	..	..	..	..	..	..	2	..	3	1	3	..	2	..	1	..	4	8	..	1	..	..	..	..	3	..	..	1	..	..	2	..	..	..	..	..	..	..	3	..	4	..	..	18	..	..	..
Oregon	93	..	..	2	15	6	..	..	..	..	..	..	3	1	7	1	1	5	..	1	..	1	6	..	3	..	4	..	..	..	..	1	1	..	2	..	..	2	..	1	2	3	1	1	..	..	3	..	4	..	..	18	..	..	..
Pennsylvania	441	..	..	..	7	..	..	..	4	..	2	..	8	3	1	1	2	6	1	15	..	8	6	1	9	..	2	1	..	8	..	14	2	..	10	2	..	..	..	3	..	3	3	1	1	8	..	1	1	..	4	300	3	..	..
Rhode Island	22	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	1	..	..	8	1	..	..	4	..	1	..	..	..	17	..	1	..
South Carolina	54	..	..	..	..	..	..	..	..	..	7	..	..	1	..	..	..	..	1	..	2	..	..	..	..	2	..	..	..	..	1	..	..	8	..	3	..	..	1	1	..	..	8	1	..	..	4	..	1	..	..	..	18	..	..	..
South Dakota	19	..	..	..	2	..	..	..	..	..	..	..	..	..	3	..	..	1	..	..	..	..	..	..	3	..	1	..	..	..	..	..	..	..	2	1	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	4	..	..	..
Tennessee	97	2	..	1	6	1	..	..	1	..	5	..	3	..	..	1	5	7	..	8	..	1	1	6	4	..	..	2	1	..	1	..	..	..	6	4	..	2	1	..	1	..	..	..	4	..	1	..	..	..	24	..	..	..
Texas	197	2	1	12	5	4	..	..	..	1	3	..	19	4	4	1	11	24	..	8	1	3	7	5	7	..	3	..	..	2	1	3	2	..	9	11	1	7	..	..	..	16	..	..	1	7	1	1	4	1	4	..	1	..	..
Utah	48	..	1	1	5	1	..	..	..	..	..	..	4	..	2	1	..	1	..	1	..	2	..	..	5	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..	..	2	..	..	1	1	1	14	..	..	..
Vermont	32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	1	..	2	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	27	..	..	..
Virginia	133	..	..	2	3	1	..	..	4	..	2	..	4	2	2	..	2	6	..	8	..	2	1	1	2	..	..	..	..	..	..	5	7	..	5	..	..	9	1	2	..	..	3	..	..	..	..	2	1	..	1	55	..	..	..
Washington	182	..	..	1	24	1	1	..	..	..	1	9	2	6	5	1	1	2	3	..	7	10	1	15	..	7	..	..	1	..	1	..	2	6	3	12	3	1	..	..	1	2	1	..	4	..	..	4	..	..	39	..	5	..
West Virginia	54	..	..	..	1	..	..	..	..	..	..	2	1	1	..	2	..	1	9	1	1	..	..	1	..	..	..	..	..	..	..	..	1	..	10	..	..	4	..	1	..	..	..	1	6	..	..	2	..	..	9	..	..	..
Wisconsin	119	..	..	1	2	3	..	..	..	..	..	24	1	1	1	..	..	2	..	1	9	9	..	1	..	..	..	..	..	..	..	1	..	..	7	1	1	2	..	..	1	1	4	..	..	..	1	..	..	1	2	..	4	..	..	..
Wyoming	19	..	..	1	2	3	..	..	..	..	..	..	1	..	2	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	19	20	..	..	6
Alaska, Guam, Hawaii, and Puerto Rico	78	..	..	..	4	1	1	..	..	..	2	..	..	..	..	..	1	..	..	..	..	2	..	..	3	..	..	..	..	..	..	2	..	..	..	..	..	2	1	..	..	1	2	..	..	4	1	..	..	..	..	39	..	..	12
Totals	8,202	28	11	80	214	82	22	3	45	8	84	2	394	136	141	119	108	187	20	210	26	183	196	59	276	3	119	3	6	54	2	253	79	7	255	57	41	337	21	41	16	205	152	24	22	150	34	36	107	4	62	3,410	18	31	19
Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55

Licentiates Representing Additions to the Medical Profession

Licentiates of 1954 who received their first license to practice medicine and surgery during the last calendar year and thus represent additions to the medical profession are shown in table 11. The compilation of this table includes candidates examined and licensed in 1954, some who were examined in previous years but whose licenses were withheld until 1954 pending completion of a required internship, citizenship, or other technicalities, and physicians not previously licensed in any state who were certified during the year on the basis of the examinations of the National Board of Medical Examiners. The figures also include physicians licensed on the basis of government credentials, Canadian licenses, and by special exemption. The majority represent recent graduates.

There were 7,917 additions to the medical profession in the United States and its territories and outlying possessions. In 1954, 3,667 deaths of physicians were reported to the offices of the American Medical Association. Deducting the number of deaths in 1954 from the number of persons licensed for the first time, the net increase in the physician population was 4,250. The figure represents an increase of 641 in comparison with the previous year.[1] These increases occurred in 31 states.

The 7,917 licentiates representing additions to the medical profession in the last calendar year represented 5,897 who secured their licenses by examination and 2,020 by endorsement of credentials. The majority of the latter were diplomates of the National Board of Medical Examiners.

The number of first licentiates arranged in nine geographical divisions are compiled in table 12. The geographical divisions representing the greatest number of additions to the medical profession were the Middle Atlantic States, with 1,680, the East North Central States, with 1,607, and the South Atlantic States, with 1,074.

In the 20 years from 1935 to 1954, inclusive, there were 127,427 new additions to the medical profession as determined by the number who received their first license. Figures for each year during this period are presented in table 13. Of the 127,427 in this group, 106,979 were licensed after written examination and 20,448 by endorsement of credentials. The total number of licenses issued in the same period (table 3) was 222,773.

Registration of Physicians, 1904-1954

A tabulation of total numbers of physicians registered for 51 years from 1904 to 1954, inclusive, is given in table 14. This study contains figures pertaining to the number of physicians examined and registered by written examination, the annual percentage of failures, the number registered annually by reciprocity or endorsement of credentials, and the total registered. The number of physicians registered annually from 1904 to 1933 shows slight fluctuation, except in 1918, when only 4,231 were licensed, the lowest registration in 51 years. This decrease was due to a sudden withdrawal of physicians from civilian life in World War I. After 1933 there was an upward trend, except during the years 1940 to 1943, inclusive. The marked increase in 1943 was the result of the acceleration of the medical school curriculum and the efforts on the part of medical educators of the country to maintain a steady flow of physicians for both civilian and medical practice. The greatest number of physicians registered in any year was in 1946. The licensure of medical officers by endorsement of credentials and the original licensure of physicians who had entered military service on completion of the internship accounts in large measure for the increase that almost doubled the registration of the previous year.

In the years since 1946, the numbers registered decreased annually until 1952, although they far exceeded the prewar totals. The last three years has shown an increase in the number of physicians registered. The year 1954 ranked second only to 1946.

The highest percentage of failures was 21.7% in 1908. Many of the medical schools at that time were proprietary institutions operating for financial returns rather than improvement of the medical curriculum. Beginning in 1915, the percentage of failures began to drop, reaching a low of 5.7% in 1930. Beginning in 1936, the percentage of failures began to rise, reaching another peak of 20.7% in 1940. This was the result of the increase in the number of foreign-trained physicians seeking licensure in the United States, many of whom are not successful after repeated attempts at licensure examinations. While the percentage of failures has been reduced somewhat in recent years, it still reflects the unsuccessful attempts of foreign-trained physicians, graduates of unapproved medical schools, and schools of osteopathy to secure licensure. The annual failure rate among graduates of approved medical schools is about 4%. This table again refers to examinations given annually rather than to individuals examined. A candidate who fails more than once in a state in a given year is counted as one failure, but should he again fail in a succeeding year this fact is computed among the failures for that year. Likewise, a successful candidate securing a license in more than one state in a given year is counted in both states and likewise counted if he passed at examinations in later years. The figures in this table give only a fair approximation of the number of physicians added to the profession.

Graduates of Approved Schools and Others Registered, 1922-1954

In table 15, the numbers of physicians registered since 1922 are grouped in two categories, namely, graduates of approved medical schools and others. In the computation of these figures, schools rated as class A and B prior to 1928 by the Council on Medical Education and Hospitals of the American Medical Association are classified as approved. In 1928, the classification A, B, and C by the Council was discontinued, and a list of approved medical schools has since been maintained. In the column headed "others" are included graduates of foreign faculties of medicine, class C graduates, osteopaths given recognition by medical licensing boards, and graduates of schools not approved by the Council.

In 1954 there were 15,235 candidates registered, of whom 13,814, or 90.7%, represented graduates of ap-

1. J. A. M. A. 155: 464 (May 29) 1953.

Marginal Number	SCHOOL	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine
	Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	ALABAMA																		
1	Medical College of Alabama, Birmingham	3	..	..	3	..	..	..	..	..	2	..	..	1	..	..	1	1	..
	ARKANSAS																		
2	University of Arkansas School of Medicine, Little Rock	2	1	..	14	1	..	..	..	..	2	..	..	1	..	..	2	11	..
	CALIFORNIA																		
3	College of Medical Evangelists, Loma Linda-Los Angeles	..	2	1	18	.	..	..	..	..	1	4	..	3	1	1	5	1	1
4	University of Southern California School of Medicine, Los Angeles	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
5	Stanford University School of Medicine, Stanford-San Francisco	1	1	..	4	..	2	..	1	..	..	..	1	..	..	..	..	2	..
6	University of California School of Medicine, San Francisco	..	1	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..
	COLORADO																		
7	University of Colorado School of Medicine, Denver	..	5	1	14	2	..	..	..	..	..	3	..	2	1	2	..	..	..
	CONNECTICUT																		
8	Yale University School of Medicine, New Haven	..	..	..	16	1	20	..	..	..	..	1	5	1	..	5	..	..	1
	DISTRICT OF COLUMBIA																		
9	Georgetown University School of Medicine, Washington	3	..	..	18	2	5	1	19	..	..	..	2	1	..	..	2	..	..
10	George Washington University School of Medicine, Washington	3	1	..	26	2	3	..	24	..	1	..	4	..	2	..	2	..	..
11	Howard University College of Medicine, Washington	1	..	..	15	..	2	..	6	..	2	..	..	3	1	..	2	..	..
	GEORGIA																		
12	Emory University School of Medicine, Atlanta	4	1	..	2	..	1	..	1	..	2	..	..	..	1	..	1	3	..
13	Medical College of Georgia, Augusta	7	..	..	5	..	..	..	2	..	..	1	..	..	..	2	2	6	..
	ILLINOIS																		
14	Chicago Medical School	..	..	..	16	1	2	..	..	..	..	..	11	2	..	..	..	1	..
15	Northwestern University Medical School, Chicago	..	4	3	54	3	..	..	2	..	2	..	11	8	5	4	1	4	..
16	Stritch School of Medicine of Loyola University, Chicago	..	1	..	32	1	..	..	2	..	..	1	5	6	2	..	1	..	..
17	University of Chicago, The School of Medicine	..	..	..	24	2	1	1	1	..	3	..	7	4	2	3	1	..	..
18	University of Illinois College of Medicine, Chicago	5	4	1	81	8	3	..	1	..	..	..	10	9	5	5	1	4	..
	INDIANA																		
19	Indiana University School of Medicine, Bloomington-Indianapolis	..	6	..	38	3	2	1	..	..	..	..	10	..	1	1	2	5	1
	IOWA																		
20	State University of Iowa College of Medicine, Iowa City	..	4	..	41	2	..	..	..	..	2	..	5	2	11	1	1	2	..
	KANSAS																		
21	University of Kansas School of Medicine, Lawrence-Kansas City	..	1	..	21	4	2	..	..	..	2	1	1	4	3	..	..	4	1
	KENTUCKY																		
22	University of Louisville School of Medicine, Louisville	2	..	1	27	1	2	..	1	..	4	..	1	9	..	1	3	1	..
	LOUISIANA																		
23	Louisiana State University School of Medicine, New Orleans	3	1	1	9	1	1	..	..	..	..	..	1	1	1	1	1	4	..
24	Tulane University of Louisiana School of Medicine, New Orleans	15	..	5	16	3	4	..	1	..	7	..	1	..	..	1	..	12	..
	MARYLAND																		
25	Johns Hopkins University School of Medicine, Baltimore	2	..	..	16	1	4	..	3	..	1	..	..	3	..	2	1	2	2
26	University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore	..	..	..	10	1	2	2	3	..	4	..	..	1	1	..	3	2	1
	MASSACHUSETTS																		
27	Boston University School of Medicine	1	..	..	16	1	6	..	..	..	..	..	1	..	1	..	2	..	2
28	Harvard Medical School, Boston	1	..	..	38	3	16	..	2	..	1	1	9	1	1	3	1	2	8
29	Tufts College Medical School, Boston	..	..	..	24	..	14	..	2	..	..	..	2	1	1	..	..	1	9
	MICHIGAN																		
30	University of Michigan Medical School, Ann Arbor	1	3	..	26	3	2	..	..	..	2	1	6	3	..	1	2	..	2
31	Wayne University College of Medicine, Detroit	..	..	..	15	1	1	..	..	..	..	..	1	..	1	..	..	..	..
	MINNESOTA																		
32	University of Minnesota Medical School, Minneapolis	1	1	..	70	3	1	1	..	..	..	..	..	3	3	..	..	..	..
	MISSOURI																		
33	St. Louis University School of Medicine	..	2	2	35	6	2	..	2	..	..	4	5	4	3	3	1	2	..
34	Washington University School of Medicine, St. Louis	1	1	2	20	1	2	..	1	..	1	1	8	5	3	6	2	1	..
	NEBRASKA																		
35	Creighton University School of Medicine, Omaha	..	2	..	30	6	1	..	..	..	..	3	..	1	4	1	1	1	..
36	University of Nebraska College of Medicine, Omaha	1	2	..	34	8	4	..	1	..	1	2	3	2	11	5	2	4	..
	NEW YORK																		
37	Albany Medical College	..	..	..	6	1	4	..	..	..	..	..	2	..	..	..	..	..	1
38	University of Buffalo School of Medicine	..	..	..	15	..	3	2	1	..	..	..	3	..	..	1	1	..	1
39	Columbia University College of Physicians and Surgeons, New York	..	..	..	22	2	21	..	3	..	..	..	3	1	1	1	1	1	2
40	Cornell University Medical College, New York	2	..	..	16	2	9	1	1	..	3	..	..	1	1	1	2	..	3
41	New York Medical College, Flower and Fifth Avenue Hospitals	4	3	..	31	2	19	..	4	..	..	..	2	..	1	..	..	..	..
42	New York University College of Medicine	..	..	..	25	1	24	..	3	..	1	..	3	1	..	1	..	..	..
43	State University of New York College of Medicine, New York City	..	..	..	21	1	20	..	2	..	..	..	6	1	2	1	..	..	..
44	University of Rochester School of Medicine and Dentistry	..	..	..	18	2	7	..	1	..	2	..	1	1	..	1	1	..	1
45	State University of New York College of Medicine, Syracuse	1	..	..	10	..	1	..	..	..	..	..	3	..	..	2	..	..	..
	NORTH CAROLINA																		
46	Duke University School of Medicine, Durham	3	..	..	11	2	2	..	3	..	4	..	3	1	..	..	5	1	..
47	Bowman Gray School of Medicine of Wake Forest College, Winston-Salem	2	..	..	4	..	..	..	1	..	2	..	..	1	..	..	..	3	..
48	University of North Carolina School of Medicine, Chapel Hill	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	OHIO																		
49	University of Cincinnati College of Medicine	..	2	..	22	3	2	..	2	..	2	..	3	9	1	1	7	1	..
50	Western Reserve University School of Medicine, Cleveland	1	2	..	19	2	1	..	..	..	..	3	2	4	1	..	3	3	..
51	Ohio State University College of Medicine, Columbus	..	1	1	11	2	..	..	1	..	3	1	3	4	1	..	..	3	..
	OKLAHOMA																		
52	University of Oklahoma School of Medicine, Oklahoma City	..	3	..	10	2	..	..	..	..	..	..	1	2	..	2	1	4	..
	OREGON																		
53	University of Oregon Medical School, Portland	..	..	..	30	..	..	..	..	..	..	5	1	2	..	..	..	..	..
	Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	
Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska, Hawaii, Puerto Rico, and Guam	Totals	Marginal Number
1	1	..	..	2	1	..	..	..	..	..	..	2	..	..	..	1	..	1	..	..	..	2	2	..	..	..	..	..	..	..	..	24	1
1	..	..	3	2	15	..	1	..	..	..	..	..	..	..	1	5	1	..	..	..	..	1	11	1	..	1	1	..	1	2	1	82	2
5	2	2	2	..	3	3	1	2	..	..	..	2	4	..	4	2	10	..	..	..	..	8	2	1	..	2	11	1	..	3	4	112	3
..	..	..	..	..	..	1	..	..	..	..	3	4	..	..	1	..	..	1	..	..	..	..	1	1	..	..	4	..	..	..	..	17	4
1	..	1	5	..	..	1	..	3	..	..	..	4	1	1	1	1	..	..	..	..	..	..	1	..	..	1	2	..	..	..	3	38	5
1	..	..	3	..	..	..	1	3	..	..	..	3	..	..	..	1	..	2	..	..	..	..	..	..	..	..	1	1	..	..	2	21	6
1	..	3	4	..	2	2	1	..	..	..	2	4	..	1	1	2	6	..	..	..	1	1	2	..	..	1	1	..	1	2	..	68	7
3	9	3	3	..	5	1	..	..	2	1	2	19	2	1	3	..	1	8	1	..	..	1	1	1	..	2	3	..	..	1	2	125	8
20	8	4	1	..	..	..	..	..	1	17	..	36	..	..	2	..	..	16	2	1	..	..	..	..	..	14	..	1	4	..	4	184	9
31	1	5	4	..	..	..	..	1	..	8	1	19	..	..	6	3	..	8	..	1	..	3	..	4	..	9	2	1	1	..	1	177	10
2	..	5	..	..	5	..	..	1	..	5	..	13	..	..	8	..	..	5	..	..	..	1	2	..	..	2	1	..	1	..	..	81	11
1	2	1	..	..	3	..	..	..	..	..	..	2	4	..	1	..	..	..	..	4	..	2	1	..	..	..	..	..	..	..	1	38	12
..	..	..	..	..	1	1	..	..	..	..	..	1	3	..	2	..	..	2	..	3	..	3	2	..	..	1	..	..	..	..	..	44	13
1	..	3	..	..	..	..	..	..	..	5	..	23	..	..	1	..	2	8	..	..	..	..	..	..	..	..	..	..	1	..	..	77	14
3	3	2	4	..	1	2	1	2	..	2	5	4	..	..	7	1	7	1	..	..	..	2	11	1	..	..	11	1	9	..	..	180	15
1	..	2	3	1	..	3	1	..	..	..	..	5	1	..	4	..	..	1	..	1	..	..	3	..	..	2	1	1	3	..	1	85	16
1	4	3	2	..	3	1	..	..	..	3	..	7	..	..	2	..	3	3	..	..	1	1	1	2	..	..	2	..	1	1	..	90	17
2	2	7	1	..	8	1	2	2	..	3	1	8	1	2	8	1	1	4	1	..	2	..	1	2	..	5	4	..	15	1	1	223	18
3	2	5	7	..	3	..	1	1	..	4	1	4	2	..	14	1	1	3	..	1	..	..	4	..	..	2	2	1	..	..	1	133	19
2	..	6	3	..	4	..	4	2	..	..	1	5	1	1	5	..	6	1	..	..	2	..	6	1	2	2	8	1	4	..	2	140	20
1	1	3	2	..	30	3	1	..	..	..	1	1	..	..	2	2	..	1	..	..	..	2	1	1	..	..	5	..	2	1	..	104	21
..	2	3	2	2	4	..	..	..	..	2	..	7	3	..	10	1	1	2	..	..	..	3	1	..	..	1	2	1	..	..	2	102	22
1	..	1	2	3	1	1	1	..	..	..	..	4	..	..	2	1	1	2	..	..	..	1	9	1	..	..	..	..	1	..	..	57	23
4	..	2	3	9	4	..	..	1	..	3	3	9	5	..	1	2	5	4	..	1	1	6	15	..	..	7	3	1	..	..	2	156	24
3	3	4	3	1	4	..	..	1	..	6	..	10	1	..	4	..	1	7	..	..	1	5	3	1	..	4	3	1	1	..	1	105	25
5	4	3	1	..	1	2	..	1	1	4	..	9	5	..	11	2	..	9	..	2	..	3	2	1	1	4	..	8	..	..	..	109	26
3	44	3	1	..	1	..	..	1	4	2	1	14	1	..	3	..	1	3	..	..	..	1	..	..	1	2	1	1	..	..	3	121	27
7	76	1	8	..	5	1	..	..	3	3	1	45	1	..	15	1	1	6	4	2	..	6	2	..	1	4	6	..	9	..	4	299	28
3	82	7	1	1	1	2	1	..	6	3	1	15	1	..	..	..	..	7	7	1	..	1	..	1	..	..	2	1	..	..	..	198	29
1	3	5	..	..	4	..	1	2	1	1	1	6	1	..	12	1	2	6	..	..	..	..	..	1	1	1	7	1	5	..	2	127	30
2	..	2	..	..	1	..	..	..	..	..	..	7	1	..	1	..	..	2	..	..	..	..	1	..	..	1	..	..	1	..	..	38	31
2	1	5	5	..	1	6	2	1	..	1	2	7	1	1	3	..	3	5	..	..	..	1	3	..	..	1	6	..	10	..	..	150	32
2	2	3	2	..	..	2	..	..	..	4	..	1	..	..	15	1	2	3	..	1	1	..	4	2	..	1	12	..	2	1	1	133	33
5	7	..	3	..	2	..	1	1	..	1	1	6	3	..	5	5	4	7	..	1	..	5	5	2	..	3	4	1	2	..	1	130	34
..	..	2	7	..	3	2	3	1	..	2	..	3	1	..	2	..	..	..	..	..	3	..	2	3	..	..	1	..	..	2	..	87	35
..	2	6	2	..	3	4	..	..	..	..	..	3	..	..	5	1	4	1	..	..	1	..	2	1	1	..	7	..	..	..	..	123	36
4	6	..	2	..	1	..	..	1	..	4	..	40	1	2	5	..	..	3	..	1	..	..	..	1	4	2	..	..	..	2	1	94	37
2	3	1	4	..	..	..	..	..	..	2	..	47	1	..	7	..	..	5	..	..	..	..	1	..	1	2	..	..	1	..	3	107	38
6	18	2	3	1	1	1	..	..	2	18	..	85	1	..	5	1	..	10	..	..	..	1	1	..	..	2	5	2	1	..	1	225	39
3	11	4	1	1	3	..	..	..	..	14	..	71	1	..	2	..	1	8	..	..	..	..	..	1	1	2	..	..	..	1	..	167	40
6	7	3	2	1	2	..	..	..	2	24	1	109	..	..	1	..	..	7	..	..	..	1	..	..	1	3	2	..	3	..	2	243	41
6	4	5	..	..	2	..	..	1	1	22	1	102	1	..	6	..	..	7	..	..	..	2	1	..	2	4	..	..	..	..	2	228	42
1	12	7	..	..	..	..	..	..	..	26	..	112	..	..	3	..	..	8	1	..	..	3	1	..	1	2	..	..	..	..	..	231	43
7	4	2	4	..	1	..	..	1	1	3	..	35	..	..	6	..	..	4	..	1	..	4	..	3	..	2	5	1	1	..	..	120	44
3	6	4	3	..	..	..	..	..	1	3	..	58	..	..	2	..	1	6	..	..	..	..	..	..	..	2	..	..	..	..	1	107	45
5	1	3	..	..	3	..	..	..	..	2	..	12	6	1	1	2	..	3	..	7	..	3	2	..	..	9	..	2	3	..	..	100	46
..	1	..	..	..	2	..	..	..	..	..	..	5	1	..	..	..	..	1	..	3	..	1	..	..	..	..	1	1	..	..	..	29	47
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	48
1	..	6	1	..	1	..	..	..	..	1	1	1	..	1	..	..	1	3	..	1	1	1	4	..	..	3	..	2	1	..	..	85	49
..	1	4	2	..	..	1	1	1	..	2	..	1	1	1	1	1	1	6	..	1	..	..	..	..	..	..	..	..	3	..	3	72	50
3	3	9	1	..	2	1	..	1	..	..	..	..	1	..	..	..	1	2	..	..	..	..	2	..	..	1	5	6	2	..	..	71	51
1	..	2	1	..	2	..	1	..	1	..	5	2	1	1	..	..	1	2	..	..	1	1	10	..	..	..	3	..	1	..	..	61	52
..	..	3	2	..	..	2	..	..	..	1	..	2	1	..	..	..	8	1	..	..	..	..	1	..	..	..	15	..	..	..	1	75	53
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	

TABLE 10.—CANDIDATES LICENSED BY

Marginal Number	SCHOOL	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine
	Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PENNSYLVANIA																		
54	Hahnemann Medical College and Hospital of Philadelphia	1	2	..	23	..	5	1	..	..	4	..	1	2	..	1	1	2	..
55	Jefferson Medical College of Philadelphia	1	4	..	33	..	3	4	3	..	1	..	2	4	1	2	..	4	1
56	Temple University School of Medicine, Philadelphia	1	..	..	31	3	3	1	..	..	2	..	..	2	..	1	4	1	1
57	University of Pennsylvania School of Medicine, Philadelphia	1	2	1	22	3	3	..	2	..	2	1	3	2	1	2	1	2	2
58	Woman's Medical College of Pennsylvania, Philadelphia	1	1	..	14	..	1	..	..	..	..	..	2	..	..	..	2	..	..
59	University of Pittsburgh School of Medicine	..	1	..	16	..	1	1	2	..	..	..	1	4	1	..	..	..	..
	SOUTH CAROLINA																		
60	Medical College of South Carolina, Charleston	1	..	..	2	..	1	..	1	..	5	..	1	2	..	..	1	2	..
	TENNESSEE																		
61	University of Tennessee College of Medicine, Memphis	1	1	8	16	1	1	..	2	..	8	..	2	2	..	4	6	18	..
62	Meharry Medical College, Nashville	3	..	1	14	..	1	..	..	..	1	..	1	2	1	1	1	..	..
63	Vanderbilt University School of Medicine, Nashville	5	1	3	16	2	1	..	..	..	6	1	3	2	2	..	3	6	..
	TEXAS																		
64	Southwestern Medical School of the University of Texas, Dallas	1	..	..	5	2	..	..	..	..	..	..	..	..	..	1	..	2	..
65	University of Texas School of Medicine, Galveston	1	1	1	22	1	..	..	2	..	1	..	..	2	..	1	..	5	..
66	Baylor University College of Medicine, Houston	..	1	3	9	1	..	..	..	..	..	1	2	2	1	..	..	3	..
	UTAH																		
67	University of Utah School of Medicine, Salt Lake City	..	..	..	11	1	..	..	..	..	..	2	1	2	..	..	..	..	..
	VERMONT																		
68	University of Vermont College of Medicine, Burlington	..	1	1	8	..	10	1	1	..	..	..	1	..	..	..	..	..	3
	VIRGINIA																		
69	University of Virginia School of Medicine, Charlottesville	..	..	..	13	..	3	..	4	..	3	..	1	1	..	..	3	..	..
70	Medical College of Virginia, Richmond	..	..	1	12	..	1	..	1	..	1	..	1	1	..	3	2	2	..
	WASHINGTON																		
71	University of Washington School of Medicine, Seattle	..	..	..	3	..	..	..	..	..	..	1	..	..	..	..	..	..	..
	WISCONSIN																		
72	University of Wisconsin Medical School, Madison	..	..	..	19	4	..	..	2	..	1	..	3	2	1	1	..	1	..
73	Marquette University School of Medicine, Milwaukee	..	2	..	28	1	3	..	2	..	..	..	7	3	2	..	..	1	..
	PUERTO RICO																		
74	University of Puerto Rico School of Medicine, San Juan	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	CANADA																		
75	University of Alberta Faculty of Medicine, Edmonton	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
76	University of British Columbia School of Medicine, Vancouver	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
77	University of Manitoba Faculty of Medicine, Winnipeg	..	..	..	3	1	..	..	..	..	..	..	1	..	1	..	..	..	..
78	Dalhousie University Faculty of Medicine, Halifax	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
79	Queen's University Faculty of Medicine, Kingston	..	..	..	3	..	2	..	1	..	..	..	..	1	..	..	..	..	1
80	University of Ottawa Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
81	University of Western Ontario Faculty of Medicine, London	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
82	University of Toronto Faculty of Medicine	..	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	..
83	McGill University Faculty of Medicine, Montreal	..	2	..	12	1	3	..	1	..	1	1	..	2	1	..	..	1	1
84	University of Montreal Faculty of Medicine	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
85	Laval University Faculty of Medicine, Quebec	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	OTHERS																		
86	Foreign Medical Faculties	..	1	..	1	..	19	3	14	..	3	..	3	16	2	..	1	..	7
87	Extinct Medical Schools	1	2	..	5	..	..	..	2	..	..	..	1	2	..	..	1	..	1
88	Unapproved Medical Schools	..	1	..	19	..	..	..	..	..	..	..	2	..	1	..	..	..	..
89	Schools of Osteopathy	..	..	..	..	22	..	1	1	..	..	..	..	11	..	..	..	..	..
90	Totals	88	79	38	1,468	136	281	21	138	0	96	39	184	178	90	76	93	142	54
	Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

proved schools and 1,421, or 9.8%, were in the second group. In the 33 years recorded in this table, 315,847 were registered, including 284,926 (90.2%) graduates of approved medical schools and 30,921 (9.8%) others.

Graduates of Unapproved Schools Registered, 1950-1954

Recorded in table 16 are data regarding graduates of institutions that have not been approved by the Council on Medical Education and Hospitals of the American Medical Association. Figures are given for those licensed after written examination and those licensed by endorsement of credentials. The table also includes a column combining the figures for these two groups. They represent graduates of five unapproved medical schools, all but one of which is now extinct. The latter institution has obtained the status of an approved school. There were 279 graduates of unapproved medical schools registered from 1950 to 1954, inclusive, 125 by examination and 154 by endorsement of credentials.

California, Florida, Massachusetts, New York, and Texas licensed the greatest number of graduates of unapproved medical schools. Twenty-nine boards were represented in the five year period. In 1954, there were 57 licensed by 14 boards, 21 by examination, and 36 by reciprocity.

Graduates of Schools of Osteopathy Registered by Medical Examining Boards, 1950-1954

The number of graduates of schools of osteopathy granted the privilege of practicing medicine or surgery or both by 16 licensing boards from 1950 to 1954, inclusive, is given in table 17. There have been 1,125 such persons registered, 809 by examination and 316 without written examination. In 1954, 14 boards licensed osteopathic physicians to practice. Two boards admitted these graduates after examination and four by reciprocity, while eight boards licensed them after both methods. Following is a summary of the actions and regulations of 16 boards providing for the licensing of osteopaths by the medical examining board.

In Colorado an osteopath receives a license to practice medicine. In Connecticut any registered osteopath may

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	
Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska, Hawaii, Puerto Rico, the Canal Zone, and Guam	Totals	Marginal Number
2	1	1	1	1	1	..	..	..	..	15	1	15	..	1	6	1	..	65	1	2	1	..	..	..	1	..	..	1	2	..	1	163	54
8	6	4	3	2	1	..	..	..	1	23	2	12	1	1	6	..	1	26	..	2	..	..	5	1	1	4	2	1	..	..	3	179	55
4	4	4	5	..	2	..	1	1	..	17	2	14	1	..	7	1	..	72	..	..	1	..	..	1	1	3	3	1	1	..	5	201	56
4	4	2	6	..	1	2	1	..	1	10	..	29	3	..	7	2	..	30	1	..	..	1	4	..	1	4	3	3	1	..	3	173	57
2	2	..	2	1	..	..	..	..	..	3	..	14	..	..	4	..	..	9	..	..	..	1	..	..	..	..	..	..	..	..	..	59	58
1	2	1	3	..	2	..	..	..	..	2	..	8	..	..	14	..	..	3	..	1	..	..	2	1	..	2	..	..	..	..	..	69	59
..	1	1	..	2	..	..	..	..	..	..	1	1	7	..	2	..	1	2	..	..	..	..	..	..	..	2	..	1	..	..	..	37	60
1	..	3	..	3	4	1	..	..	2	1	2	1	3	..	6	5	3	3	..	6	1	5	14	1	..	..	1	..	1	..	1	138	61
..	1	5	..	3	3	..	..	..	..	2	..	5	..	..	7	..	1	3	..	..	..	1	1	..	..	1	..	..	..	..	..	59	62
3	2	2	..	2	1	..	1	..	..	..	2	3	1	..	2	3	..	..	..	2	..	3	4	..	..	..	..	..	..	..	..	82	63
..	1	2	..	..	2	..	..	..	..	..	..	..	..	..	1	1	1	1	..	..	1	1	2	1	..	1	..	..	1	..	2	29	64
3	1	5	2	1	1	1	1	..	..	..	3	3	2	..	..	3	..	..	..	1	..	1	1	..	..	1	1	..	1	..	..	69	65
..	..	..	..	..	..	..	1	..	..	..	1	2	1	..	..	4	..	2	..	..	..	..	2	..	..	1	1	..	2	..	..	40	66
..	..	..	..	..	..	1	..	1	..	1	1	2	..	..	..	..	1	1	..	..	..	..	2	4	..	..	1	..	..	..	..	32	67
1	11	2	2	..	1	..	..	..	5	3	..	16	..	1	2	..	..	5	..	..	..	..	1	..	8	..	3	1	..	..	..	88	68
4	3	1	4	..	1	1	..	..	1	1	..	12	5	1	3	..	1	6	..	5	..	2	4	1	..	1	1	3	..	..	3	92	69
3	2	..	1	..	1	..	..	..	..	..	..	6	10	..	9	..	..	6	1	1	..	3	5	1	..	3	..	3	1	..	1	82	70
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	4	..	..	..	..	11	71
1	1	..	3	..	..	..	..	..	..	1	..	4	..	2	1	..	2	..	..	..	..	..	1	1	..	1	2	..	7	1	1	63	72
..	2	3	2	..	..	..	..	..	..	4	..	8	..	..	4	1	3	1	..	..	..	1	..	..	..	..	2	..	5	1	1	87	73
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	74
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	3	75
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	76
..	1	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	10	77
..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	78
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	9	79
..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	80
1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	81
..	..	1	..	..	..	..	..	..	..	..	..	5	..	..	2	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	13	82
..	6	2	2	..	..	1	..	2	..	1	..	9	..	..	2	..	..	..	1	..	..	..	..	2	1	..	3	..	..	..	..	58	83
..	1	..	1	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	84
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	85
1	4	7	..	..	1	1	1	1	6	24	1	8	1	..	48	1	..	..	1	..	..	..	..	..	2	..	4	..	3	..	3	188	86
..	1	3	..	..	1	..	..	..	..	1	..	4	..	..	1	..	1	1	..	1	..	2	4	1	..	1	..	1	2	..	..	40	87
..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	7	..	..	..	..	..	..	..	1	36	88
..	2	..	..	..	..	..	..	..	1	18	..	1	..	..	13	..	..	..	..	..	..	..	13	..	..	1	..	..	1	..	..	85	89
206	398	207	150	41	163	52	32	36	43	329	51	1,178	95	19	352	64	93	441	22	54	19	97	197	48	32	133	182	54	119	19	78	8,202	90
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	

obtain the right to practice medicine or surgery or both according to the type of examination taken. Osteopaths in Delaware may be licensed as osteopathic physicians after successfully passing an examination in selected subjects. The District of Columbia will permit any person engaged in the practice of osteopathy on or before Jan. 1, 1928, to file application for a license to practice osteopathy and surgery. Under an amendment to the medical practice act in 1945, osteopaths in Indiana are permitted to practice medicine and surgery. Persons who were licensed in osteopathy before 1945 are authorized to practice osteopathy, surgery, and obstetrics.

In Massachusetts the medical practice act by definition includes osteopathy in the practice of medicine and does not differentiate the type of license issued to an osteopathic physician. In New Hampshire osteopaths are granted the right to practice medicine and surgery.

New Jersey provides that osteopaths licensed prior to Nov. 1, 1941, who have served for a period of two years as an intern or resident surgeon in an approved osteopathic or medical hospital, or have completed a post-graduate course of two years in a college of osteopathy or medicine approved by the board, or have had at least three years of practice in a hospital approved by the board, can be admitted to an examination in pharmacology, therapeutics, and surgery. If successful, they can obtain a license to practice medicine and surgery.

In New York a law approved April 10, 1946, provides that any osteopathic licentiate who had obtained the additional right to use instruments for minor surgical procedures and to use anesthetics, antiseptics, narcotics, and biological products, or any applicant who had met or would meet all the preliminary and professional requirements as of Sept. 1, 1936, and has satisfactorily passed or would pass the regular licensing examination would be granted the right to practice medicine without limitation.

Osteopaths in Ohio who obtained their license under an act passed in 1943 are given the right to apply for an examination in surgery and if successful are licensed to practice osteopathy and surgery. In Oregon osteopaths are granted the right to practice in the subjects covered

by the examination. In South Dakota, osteopaths may be issued a license to practice osteopathic medicine, surgery, and obstetrics, which is an unrestricted license. Texas issues only one license, which is unrestricted in scope. In Virginia osteopaths may obtain the right to use drugs and to perform surgery with instruments.

The Wisconsin law, as amended in 1950, provides that an osteopath licensed in Wisconsin may obtain a license to practice medicine and surgery by completing a refresher course in materia medica and pharmacology consisting of not less than 64 hours of lecture and 60 hours of laboratory work and by passing an examination in these subjects. Osteopaths not licensed in the state may apply to take the same examination as physicians. If successful, they will be granted licenses to practice medicine and surgery. In Wyoming the statutes contain no specific provision for the licensing of osteopaths. The medical practice act provides that the certificate issued to all applicants shall be deemed a license to practice medicine in all branches in which the applicant has taken an examination.

TABLE 11.—*Licentiates Representing Additions to the Medical Profession, 1954*

	Examination	Reciprocity and Endorsement	Total
Alabama	49	13	62
Arizona	2	5	7
Arkansas	68	0	68
California	464	152	616
Colorado	94	25	119
Connecticut	27	83	110
Delaware	7	0	7
District of Columbia	8	50	58
Florida	96	0	96
Georgia	173	1	174
Idaho	5	0	5
Illinois	429	42	471
Indiana	184	2	186
Iowa	122	13	135
Kansas	122	5	127
Kentucky	112	11	123
Louisiana	225	0	225
Maine	21	12	33
Maryland	234	27	261
Massachusetts	23	229	252
Michigan	226	35	261
Minnesota	216	26	242
Mississippi	80	3	83
Missouri	242	15	257
Montana	7	2	9
Nebraska	100	0	100
Nevada	0	0	0
New Hampshire	10	9	19
New Jersey	52	72	124
New Mexico	6	0	6
New York	271	776	1,047
North Carolina	214	2	216
North Dakota	11	1	12
Ohio	490	60	550
Oklahoma	77	3	80
Oregon	47	7	54
Pennsylvania	271	238	509
Rhode Island	35	9	44
South Carolina	68	5	73
South Dakota	16	3	19
Tennessee	202	7	209
Texas	332	6	338
Utah	17	5	22
Vermont	12	19	31
Virginia	170	6	176
Washington	74	15	89
West Virginia	12	1	13
Wisconsin	133	6	139
Wyoming	3	0	3
Alaska	0	0	0
Canal Zone	0	0	0
Hawaii	2	4	6
Philippine Islands	0	0	0
Puerto Rico	36	15	51
Virgin Islands	0	0	0
Canada	0	0	0
Guam	0	0	0
Totals	5,897	2,020	7,917

Preprofessional Training Requirements of Licensing Boards

In order to provide an opportunity for medical students to gain a broad educational background, the Council on Medical Education and Hospitals of the American Medical Association recommends four years of preprofessional college training. Since January, 1953, the minimum requirement for admission to an approved medical

TABLE 12.—*Licentiates Representing Additions to the Medical Profession Grouped in Geographical Divisions, 1954*

	Examination	Reciprocity and Endorsement	Total
New England			
Maine	21	12	33
New Hampshire	10	9	19
Vermont	12	19	31
Massachusetts	23	229	252
Rhode Island	35	9	44
Connecticut	27	83	110
Totals	128	361	489
Middle Atlantic			
New York	271	776	1,047
New Jersey	52	72	124
Pennsylvania	271	238	509
Totals	594	1,086	1,680
East North Central			
Ohio	490	60	550
Indiana	184	2	186
Illinois	429	42	471
Michigan	226	35	261
Wisconsin	133	6	139
Totals	1,462	145	1,607
West North Central			
Minnesota	216	26	242
Iowa	122	13	135
Missouri	242	15	257
North Dakota	11	1	12
South Dakota	16	3	19
Nebraska	100	0	100
Kansas	122	5	127
Totals	829	63	892
South Atlantic			
Delaware	7	0	7
Maryland	234	27	261
District of Columbia	8	50	58
Virginia	170	6	176
West Virginia	12	1	13
North Carolina	214	2	216
South Carolina	68	5	73
Georgia	173	1	174
Florida	96	0	96
Totals	982	92	1,074
East South Central			
Kentucky	112	11	123
Tennessee	202	7	209
Alabama	49	13	62
Mississippi	80	3	83
Totals	443	34	477
West South Central			
Arkansas	68	0	68
Louisiana	225	0	225
Oklahoma	77	3	80
Texas	332	6	338
Totals	702	9	711
Mountain			
Montana	7	2	9
Idaho	5	0	5
Wyoming	3	0	3
Colorado	94	25	119
New Mexico	6	0	6
Arizona	2	5	7
Utah	17	5	22
Nevada	0	0	0
Totals	134	37	171
Pacific			
Washington	74	15	89
Oregon	47	7	54
California	464	152	616
Totals	585	174	759
Territories and Possessions			
Canal Zone, Guam, Hawaii, and Puerto Rico	38	19	57
Totals	5,897	2,020	7,917

school has been three years of college work, with the provision that rarely and only under exceptional circumstances will an approved medical school be justified in admitting a superior student with only two years of college preparatory work.

TABLE 13.—*Licentiates Representing Additions to the Medical Profession, 1935-1954*

Year	Examination	Reciprocity and Endorsement	Total
1935	5,099	411	5,510
1936	5,548	629	6,177
1937	5,812	612	6,424
1938	5,759	501	6,260
1939	5,584	460	6,044
1940	5,432	455	5,887
1941	5,241	474	5,715
1942	5,560	454	6,014
1943	5,586	372	5,958
1944	6,495	470	6,965
1945	4,979	769	5,748
1946	5,362	1,608	6,970
1947	5,273	1,617	6,890
1948	4,942	1,694	6,636
1949	4,260	1,616	5,876
1950	4,609	1,393	6,002
1951	4,985	1,288	6,273
1952	5,168	1,717	6,885
1953	5,388	1,888	7,276
1954	5,897	2,020	7,917
Total	106,979	20,448	127,427

TABLE 14.—*Registration of Physicians, 1904-1954*

Year	Examined	Passed	Failed, %	Reciprocity or Endorsement	Total Registered
1904	7,056	5,693	19.3	1,005	6,698
1905	7,178	5,688	20.8	394	6,082
1906	8,040	6,373	20.7	1,502	7,875
1907	7,279	5,731	21.3	1,427	7,158
1908	7,775	6,089	21.7	1,284	7,373
1909	7,295	5,865	19.6	1,381	7,246
1910	7,011	5,719	18.4	1,640	7,359
1911	6,904	5,582	19.8	1,243	6,825
1912	6,880	5,467	20.5	1,273	6,740
1913	6,453	5,253	18.6	1,292	6,545
1914	5,579	4,379	21.5	1,439	5,818
1915	5,334	4,507	15.5	1,399	5,906
1916	4,878	4,151	14.9	1,353	5,504
1917	4,754	4,085	14.0	1,360	5,445
1918	3,667	3,184	13.2	1,047	4,231
1919	4,750	4,074	14.2	2,546	6,620
1920	4,796	4,062	15.3	2,558	6,620
1921	4,825	4,228	12.4	2,186	6,414
1922	4,031	3,539	12.2	2,073	5,612
1923	4,727	4,028	14.8	2,405	6,433
1924	5,392	4,756	11.8	1,923	6,679
1925	6,002	5,450	9.2	1,861	7,311
1926	5,770	5,314	7.9	1,955	7,269
1927	5,389	5,002	7.2	2,176	7,178
1928	5,458	5,090	6.7	2,228	7,318
1929	5,629	5,282	6.2	2,420	7,702
1930	5,571	5,255	5.7	2,366	7,621
1931	5,611	5,263	6.2	2,211	7,476
1932	5,675	5,247	7.6	1,886	7,133
1933	5,673	5,244	7.6	1,989	7,233
1934	6,145	5,628	8.4	2,161	7,789
1935	6,443	5,859	9.1	2,194	8,053
1936	6,918	6,224	10.0	2,773	8,997
1937	7,334	6,604	10.0	3,205	9,809
1938	7,461	6,589	11.7	2,956	9,545
1939	7,754	6,493	16.3	2,872	9,365
1940	7,926	6,291	20.7	2,866	9,157
1941	7,539	6,057	19.7	2,762	8,819
1942	7,223	6,120	15.4	2,469	8,589
1943	8,403	7,489	10.9	2,340	9,829
1944	6,817	6,011	11.8	2,596	8,607
1945	5,930	5,343	9.9	3,622	8,965
1946	7,610	6,856	9.9	9,669	16,525
1947	7,164	6,414	10.5	7,701	14,115
1948	6,624	5,904	10.8	7,595	13,499
1949	5,963	5,219	12.5	6,929	12,148
1950	6,203	5,481	11.6	6,755	12,236
1951	6,473	5,716	11.7	6,225	11,941
1952	7,028	6,229	11.3	7,016	13,245
1953	7,425	6,543	13.0	7,869	14,412
1954	8,066	7,083	12.7	8,202	15,235

The preprofessional requirements of medical licensing boards are indicated in table 18. In five states no preprofessional requirement is mentioned in the medical practice act. Sixteen boards reported a three year requirement. In others, the law specifies at least two years of college work. No board specifies in detail the number of hours that must be devoted to the subjects of the medical curriculum while 12 boards report that this training must include certain subjects, such as English, physics, chemistry, biology, and a foreign language. Approximately 70% of the entering class in medical schools in the United States in 1953-54 had been awarded the baccalaureate degree prior to admission to medical school. The candidates appearing for medical licensure are graduates of all years, and the seeming lack of conformity with accepted standards is due to the fact that initiation of the three year requirement for all candidates appearing for licensure would eliminate many graduates of earlier years. In practice, however, the boards in granting licensure to a graduate of an approved medical school accept the premedical training required in the year the candidate was admitted to medical school.

TABLE 15.—*Graduates of Approved Schools and Others Registered, 1922-1954*

Year	Graduates of Approved Schools: No.	Graduates of Approved Schools: Percentage of Total	Others: No.	Others: Percentage of Total	Totals
1922	4,519	80.5	1,093	19.5	5,612
1923	5,196	80.8	1,237	19.2	6,433
1924	5,687	85.1	992	14.9	6,679
1925	6,314	86.4	997	13.6	7,311
1926	6,441	88.7	828	11.3	7,269
1927	6,410	89.4	768	10.6	7,178
1928	6,585	90.1	733	9.9	7,318
1929	7,003	91.0	699	9.0	7,702
1930	7,011	92.1	610	7.9	7,621
1931	6,932	92.8	544	7.2	7,476
1932	6,676	92.1	457	6.3	7,133
1933	6,774	93.7	459	6.3	7,233
1934	7,172	92.1	617	7.9	7,789
1935	7,360	91.3	693	8.5	8,053
1936	7,934	88.1	1,063	11.8	8,997
1937	8,391	85.5	1,418	14.4	9,809
1938	8,315	87.1	1,230	12.9	9,545
1939	8,067	86.2	1,298	13.8	9,365
1940	7,781	85.0	1,376	15.0	9,157
1941	7,770	87.9	1,049	11.9	8,819
1942	7,290	84.9	1,299	15.1	8,589
1943	8,640	87.9	1,189	12.2	9,829
1944	7,737	89.8	870	10.1	8,607
1945	8,233	91.8	732	8.1	8,965
1946	15,692	94.9	835	5.1	16,527
1947	13,097	93.0	1,018	7.0	14,115
1948	12,791	94.8	708	5.2	13,499
1949	11,378	93.7	770	6.3	12,148
1950	11,502	94.0	734	6.0	12,236
1951	11,027	92.3	914	7.7	11,941
1952	12,198	92.1	1,047	7.9	13,245
1953	13,189	91.5	1,223	8.5	14,412
1954	13,814	90.7	1,421	9.3	15,235
Totals	284,926	90.2	30,921	9.8	315,847

Professional Educational Requirements of Licensing Boards

The medical practice acts or board regulations of several state medical licensing boards specify the length of the medical school course. In other states, the law or ruling specifies that the professional educational requirement included in the standards for approval of the Council on Medical Education and Hospitals of the American Medical Association or for membership in the Association of American Medical Colleges, or both, is the regulation for licensure. Table 19 outlines the requirement of each licensing board. This table does not record the internship that is a requirement for licensure by 33 boards.

Approval of Medical Schools

Nine licensing boards maintain their own list of approved medical schools in the United States and Canada. Twenty-nine boards require applicants for licensure from medical schools in the United States and Canada to be graduates of medical schools approved by the Council

on Medical Education and Hospitals of the American Medical Association, 2 boards require that the medical schools be members of the Association of American Medical Colleges, and 15 boards require that the schools be approved by the Council and be members of the Association of American Medical Colleges. In 29 instances, the requirement is specifically prescribed by law; 24 boards report the requirement is by formal regulation, while 2 boards indicate it is an informal policy.

and the Chicago Medical School discontinued the requirement for the 1954 graduating class, while at Stanford University the change will affect the 1955 graduating class.

One year of internship as a prerequisite to licensure is required by the licensing boards of 28 states, the District of Columbia, Alaska, Canal Zone, Hawaii, Puerto Rico, and the Virgin Islands. The internship requirement was instituted during the past year in Kentucky.

TABLE 16.—*Graduates of Unapproved Medical Schools Registered 1950-1954*

	Examination						Reciprocity and Endorsement						Combined Totals
	1950	1951	1952	1953	1954	Totals	1950	1951	1952	1953	1954	Totals	
Arizona	..	..	..	..	..	..	..	2	..	..	1	3	3
Arkansas	1	..	..	..	..	1	..	..	..	..	..	..	1
California	2	..	..	..	..	2	5	..	..	8	19	32	34
Connecticut	..	..	..	..	..	..	..	..	1	..	..	1	1
District of Columbia	..	..	..	..	..	..	1	..	..	..	..	1	1
Florida	16	9	7	5	8	45	..	..	..	..	..	..	45
Georgia	1	1	..	3	2	5	..	1	1	1	..	3	8
Idaho	..	..	..	..	..	..	..	..	..	1	..	1	1
Illinois	5	2	..	..	..	7	..	..	..	..	2	2	9
Iowa	..	..	..	..	..	..	..	..	..	..	1	1	1
Maine	..	..	..	..	..	..	1	1	1	..	..	3	3
Maryland	..	..	5	..	..	5	..	..	..	..	..	..	5
Massachusetts	5	4	..	2	5	16	..	..	..	..	..	..	16
Michigan	..	..	..	..	..	..	1	1	1	..	1	4	4
Mississippi	1	1	..	..	..	2	..	..	..	..	..	..	2
Missouri	..	..	..	..	..	..	3	..	1	2	1	7	7
Nevada	..	..	..	..	..	..	..	..	2	..	..	2	2
New Jersey	..	..	..	3	1	4	..	..	..	..	..	..	4
New York	7	4	1	3	3	18	..	..	1	..	..	1	19
North Carolina	3	..	..	..	..	3	..	..	..	..	..	..	3
Ohio	1	..	..	..	..	1	..	..	..	1	3	4	5
Pennsylvania	1	1	2	..	..	4	..	..	1	1	..	2	6
Tennessee	..	..	..	..	..	..	..	..	..	1	..	1	1
Texas	..	..	..	..	..	..	2	45	18	9	7	81	81
Virginia	..	..	..	2	..	2	..	..	..	..	..	..	2
West Virginia	..	..	1	3	..	4	..	..	..	..	..	..	4
Wisconsin	..	..	..	..	..	..	..	1	2	..	..	3	3
Territories and possessions	2	1	..	1	2	6	..	1	..	..	1	2	8
Totals	45	23	16	20	21	125	13	52	29	24	36	154	279

TABLE 17.—*Graduates of Schools of Osteopathy Registered by Medical Boards, 1950-1954*

	Examination						Reciprocity and Endorsement						Combined Totals
	1950	1951	1952	1953	1954	Totals	1950	1951	1952	1953	1954	Totals	
Colorado	8	10	5	8	3	34	..	..	3	15	22	40	74
Connecticut	4	1	1	2	3	11	..	..	..	..	..	..	11
Delaware	..	1	..	1	..	2	..	1	2	4	1	8	10
District of Columbia	1	..	..	..	..	1	1	1	..	..	1	3	4
Indiana	3	..	7	5	2	17	..	9	9	10	11	39	56
Massachusetts	..	2	..	..	1	3	3	6	6	1	2	18	21
New Hampshire	..	..	..	..	..	..	1	..	1	3	1	6	6
New Jersey	7	2	11	11	7	38	2	6	15	10	18	51	89
New York	34	45	36	47	44	206	3	..	5	4	1	13	219
Ohio	28	46	47	64	81	266	8	8	7	20	13	56	322
Oregon	..	..	..	..	..	..	..	..	1	1	..	2	2
South Dakota	1	..	..	..	1	2	1	1	..	..	..	2	4
Texas	35	37	41	32	46	191	5	15	21	16	13	70	261
Virginia	1	..	..	..	..	1	..	..	1	1	1	3	4
Wisconsin	4	11	8	7	7	37	..	..	2	..	1	3	40
Wyoming	..	..	..	..	..	..	1	..	1	..	..	2	2
Totals	126	155	156	177	195	809	25	47	74	85	85	316	1,125

Required Internships

Table 20 lists the medical schools which require the completion of a one year internship as a prerequisite for the M.D. degree. Five approved medical schools exact this requirement. Currently, Duke University School of Medicine is the only school in the United States that specifies the internship requirement but does not withhold the degree until the internship is completed. The degree is issued at the end of the four year medical course, but the school obtains from each student a signed agreement that he will spend two years in training in a hospital or laboratory before entering practice. The College of Medical Evangelists, the University of Southern California, Thirteen boards specify that the internship must be a rotating service. Arizona indicates that a rotating service is desirable. Iowa and North Dakota, which formerly required a rotating service, now indicate that either a rotating or straight service is acceptable. Vermont, Hawaii, and the Virgin Islands, now report that the internship must be a rotating service. New Jersey specifies that a one year general rotating internship or a two year residency in a specialty will meet the board's requirement. Alaska will accept active practice for four years in lieu of the internship requirement. Those licensing boards that require an internship for licensure are listed in table 21.

Licensure Requirements for Interns and Residents in Hospitals

In general, physicians serving internships are not required to be licensed in the state in which the hospital where they are interning is located. Georgia, Wyoming, and Puerto Rico have such a requirement. New Jersey permits a service of two years without licensure and Florida a three year service before licensure. South Carolina reports that licensure is requested. Colorado, Delaware, and the District of Columbia require an intern to register with the board. In Indiana the intern must be eligible for licensure. Massachusetts permits limited registration for one year. Virginia exacts the internship requirement for graduates of unapproved medical schools, while in West Virginia graduates of foreign medical schools are required to obtain permission from the licensing board before commencing an internship in the state.

Twenty-eight boards and Puerto Rico require that physicians serving as residents in hospitals must be licensed in the state. In California the resident may serve one year without licensure. In Connecticut and Maryland it is not a requirement of the licensing board but is customarily required by hospitals in those states, while Ohio reports that licensure is required if the resident assumes full responsibility and receives pay for his services. Eleven boards do not require full licensure of residents but issue certificates limited in nature, which may be called a limited license, a resident's license, temporary permit, or temporary licensure. Colorado and Delaware require the resident to register with the licensing board. In the District of Columbia the hospital must notify the licensing board. In Florida and New Jersey residents may serve for a limited time without licensure. West Virginia permits graduates of unapproved medical schools to serve a two year residency if permission is secured from the licensing board, while in West Virginia graduates of foreign medical schools are required to be licensed.

The regulations of each of the licensing boards that exact some requirement of those engaged in intern or residency training are given in table 22.

TABLE 18.—*Preprofessional Training Requirements of Medical Licensing Boards*

Two Years or More of College

Alabama [1]	Maryland [5]	Pennsylvania [6]
Arizona	Massachusetts [3]	Rhode Island
Arkansas	Michigan [5]	South Carolina [5]
California [2-3]	Minnesota	South Dakota
Colorado [1]	Mississippi	Tennessee [5]
Connecticut [3]	Missouri	Texas
Delaware [4]	Montana	Utah [5]
District of Columbia	Nebraska	Vermont [4]
Florida [5]	Nevada [5]	Virginia
Georgia [3]	New Hampshire	Washington [1]
Idaho	New Jersey [4]	West Virginia
Illinois	New Mexico [5]	Wisconsin [3-5]
Indiana [3]	New York [6]	Wyoming [1]
Iowa [5]	North Carolina [5]	Alaska [5]
Kansas	North Dakota	Canal Zone [5]
Kentucky	Ohio	Guam
Louisiana [5]	Oklahoma [1]	Hawaii
Maine	Oregon	Puerto Rico [4]
		Virgin Islands [5]

1. Not specified by law.
2. Three years for applicants matriculating in medical school after Jan. 12, 1954.
3. For all applicants courses in physics, chemistry, and biology must be included in premedical training.
4. Premedical training must include courses in English, physics, chemistry, biology, and a foreign language.
5. Three year college requirement.
6. Premedical training must include courses in English, physics, chemistry, and biology.

Schedule of Written Examination Dates and Reciprocity Meetings

The schedule of written examination dates and meetings or oral examinations for the issuance of licenses by reciprocity or by endorsement of credentials is given in table 23. In most instances examinations are held twice annually and reciprocity meetings quarterly or as soon as the application for licensure can be processed. In those

TABLE 19.—*Professional Educational Requirements by Medical Licensing Boards*

	Length of Medical School Academic Year				Total Time Spent in Medical School (Registration to Graduation)			
	Weeks	Months	Same as A.A.M.C. and C.M.E. & H.*	Not Specified by Board	Weeks Annual	Months Annual	Years	Same as A.A.M.C. and C.M.E. & H.*
Alabama	..	9	..	..	..	..	4	x
Arizona	..	9	..	..	..	..	4	..
Arkansas	..	9	..	..	..	..	4	..
California†	..	..	..	x	..	..	4	..
Colorado	..	..	..	x	..	..	4	..
Connecticut	32	..	..	..	32	..	4	..
Delaware	..	..	..	x	..	..	4	..
District of Columbia	..	9	..	..	..	36	4	..
Florida	..	..	x	..	..	..	..	x
Georgia	..	9	..	..	..	..	4	..
Idaho	..	9	..	..	..	..	4	..
Illinois	..	9	..	..	..	..	4	..
Indiana	..	8	..	..	..	42	..	..
Iowa	..	9	..	..	..	36	..	..
Kansas	..	9	..	..	..	..	4	..
Kentucky	..	9	..	..	..	..	4	..
Louisiana	..	9	x	..	..	..	4	x
Maine	36	..	..	..	..	..	4	..
Maryland	..	..	x	..	..	..	..	x
Massachusetts	..	9	..	..	..	..	4	..
Michigan	32	..	..	..	..	36	..	..
Minnesota	36	..	..	..	..	..	4	..
Mississippi	..	8	..	..	..	..	4	..
Missouri	32	..	..	..	..	..	4	..
Montana	..	9	..	..	..	..	4	..
Nebraska	..	8	..	..	..	..	4	..
Nevada	..	9	..	..	..	..	4	..
New Hampshire	..	9	..	..	..	..	4	..
New Jersey	..	8	..	..	..	..	4	..
New Mexico	..	..	..	x	..	..	..	x
New York	..	8	..	..	..	..	4	..
North Carolina	..	..	..	x	..	..	4	..
North Dakota	..	8	..	..	32	..	4	..
Ohio	..	9	..	..	..	..	4	..
Oklahoma	..	..	..	x	..	..	..	x
Oregon	..	8	..	..	..	32	4	..
Pennsylvania	32	..	..	..	..	..	4	..
Rhode Island	..	..	..	x	..	..	4	..
South Carolina	..	9	..	..	..	..	4	..
South Dakota	..	..	..	x	..	..	..	x
Tennessee	36	..	..	..	..	..	..	x
Texas	..	8	..	..	..	..	4	..
Utah	..	9	..	..	..	..	4	..
Vermont‡	..	..	..	..	..	..	4	..
Virginia	..	8	..	..	..	32	4	..
Washington	..	..	x	..	..	..	4	x
West Virginia	..	..	..	x	..	..	4	x
Wisconsin	..	..	x	..	..	..	4	x
Wyoming	..	..	x	..	..	..	..	x
Alaska	..	..	x	..	..	..	..	x
Canal Zone	..	..	x	..	..	..	4	x
Guam	..	9	..	..	..	..	4	..
Hawaii	..	..	..	x	..	..	..	x
Puerto Rico	..	..	x	..	..	..	..	x
Virgin Islands	..	..	..	x	..	..	4	..

* Association of American Medical Colleges and Council on Medical Education and Hospitals of the American Medical Association.
x implies yes.
† 4000 hours.
‡ 900 hours.

TABLE 20.—*Medical Schools Requiring an Internship*

United States

Duke University School of Medicine *

Canada

University of Manitoba Faculty of Medicine
Dalhousie University Faculty of Medicine
University of Ottawa Faculty of Medicine
Laval University Faculty of Medicine
University of Montreal Faculty of Medicine

* Degree not withheld until internship completed.

states requiring a basic science certificate for licensure, dates of the examination or reciprocity meetings are arranged to coincide closely with the examination and meeting dates of the boards of examiners in the basic sciences. A few states issue temporary permits enabling physicians to begin the practice of medicine until the board examination or meeting is held.

TABLE 21.—*Medical Licensing Boards Requiring a One Year Internship* *

Alabama	Michigan †	Utah
Arizona **	Nevada	Vermont †
California	New Hampshire	Washington †
Colorado	New Jersey ‡	West Virginia
Delaware †	North Dakota	Wisconsin
District of Columbia	Oklahoma †	Wyoming †
Idaho	Oregon	Alaska §
Illinois †	Pennsylvania †	Canal Zone
Iowa	Rhode Island †	Hawaii †
Kansas	South Carolina	Puerto Rico †
Kentucky	South Dakota	Virgin Islands †

* Some states require the internship for graduates of medical faculties abroad and from reciprocity or endorsement applicants.
** Rotating service desirable.
† Internship must be a rotating service.
‡ One year general rotating internship or 2 year residency in a specialty.
§ Unless in active practice for four years.

TABLE 22.—*Licensure, Registration, or Other Requirements for Interns and Residents Serving in Hospitals*

Requirements for Interns

Licensure

Georgia	South Carolina [2]	Puerto Rico
New Jersey [1]	Wyoming	

Other Requirements

Colorado [3]	Florida [6]	Virginia [9]
Delaware [4]	Indiana [7]	West Virginia [10]
District of Columbia [5]	Massachusetts [8]	

1. May serve for 2 years without licensure.
2. Licensure requested
3. Registration with licensing board required annually not to exceed 4 years.
4. Must register with Medical Council of Delaware.
5. Hospital must notify licensing board.
6. Must register every 6 months with state board of health and may serve for 3 years without licensure.
7. Must be eligible for licensure.
8. Limited registration for 1 year, renewable annually for a period not to exceed 5 years.
9. Graduates of unapproved medical schools may serve 2 years if permission is secured from licensing board.
10. Graduates of foreign medical schools required to obtain permission from licensing board.

Requirements for Residents in Hospitals

Licensure or Temporary Registration Required

Arkansas	Maryland [2]	Oklahoma [12]
California [1]	Massachusetts [6]	Pennsylvania [13]
Connecticut [2]	Michigan [7]	South Carolina
Georgia	Minnesota	South Dakota
Idaho	Mississippi	Texas
Illinois [3]	Nevada [8]	Washington
Indiana	New Mexico	Wisconsin
Iowa [4]	New York [9]	Wyoming
Louisiana	North Carolina [10]	Puerto Rico
Maine [5]	Ohio [11]	

Other Requirements

Colorado [14]	Florida [16]	Virginia [18]
Delaware [14]	New Jersey [17]	West Virginia [19]
District of Columbia [15]		

1. May serve 1 year without licensure.
2. May be required by hospitals.
3. Limited license for employment as residents in hospitals maintained by the state. Temporary certificate for residency or specialty training in approved Illinois hospitals issued for 1 year's training but may be renewed.
4. Resident's license issued for 1 year and may be renewed for an additional 3 years.
5. Temporary license granted.
6. Limited registration granted.
7. Temporary licensure for graduate training.
8. Temporary permit for one year.
9. Temporary certificate for residents in approved hospitals, valid 2 years.
10. Limited license issued.
11. If a resident assumes full responsibility and receives pay for services.
12. Temporary licensure for 1 year, renewable for 2 additional years.
13. Temporary certificate for residency training in approved hospitals in the state, renewable annually.
14. Registration with licensing board required.
15. Hospital must notify licensing board.
16. Must register with state board of health every six months and may serve residency for three years without licensure.
17. May serve 2 years without licensure.
18. Graduates of unapproved medical schools may serve 2 years if permission is secured from licensing board.
19. Graduates of foreign medical schools required to be licensed.

Temporary and Educational Permits, Limited and Temporary Licenses, or Other Certificates Issued by State Licensing Boards

Thirty-three boards provide for the issuance of temporary and educational permits, limited and temporary licenses, or other certificates. The terms for the issuance of such certificates vary. This limited registration may apply to hospital training, to those ineligible for licensure who seek further educational training, or for regular practice until the next regular session of the licensing board. These states, and the length of validity of this special registration, are shown in table 24.

TABLE 23.—*Schedule of Written Examination Dates and Issuance of Licenses by Reciprocity or Endorsement of Credentials*

	Written Examinations Held	Licenses by Reciprocity or Endorsement Issued
Alabama	Annually	Continuously
Arizona	Quarterly	Quarterly
Arkansas	Twice annually	Continuously
California	Quarterly	Continuously
Colorado	Twice annually	Quarterly
Connecticut	March, July, and November	Continuously
Delaware	Twice annually	Twice annually
District of Columbia	Twice annually	Quarterly
Florida	Twice annually	No reciprocity
Georgia	June and October	June and October
Idaho	Twice annually	Twice annually
Illinois	Quarterly	Quarterly
Indiana	Annually, June	Every 6 weeks
Iowa	Twice annually	Once monthly
Kansas	Twice annually	Twice annually
Kentucky	Semiannually	Six times annually
Louisiana	June and December	June and December
Maine	March, July, and November	March, July, and November
Maryland	June and December	Monthly
Massachusetts	January and July	Monthly except August
Michigan	Semiannually	Continuously
Minnesota	Quarterly	Quarterly
Mississippi	June	June and December
Missouri	Three, annually	Six times annually
Montana	Semiannually	Semiannually
Nebraska	Annually	Continuously
Nevada	Twice annually	Quarterly
New Hampshire	Twice annually	Twice annually
New Jersey	Four, annually	Monthly except August
New Mexico	Twice annually	Twice annually
New York	February, June, and October	Continuously
North Carolina	Annually	Five times annually
North Dakota	January and July	January and July
Ohio	June and December	Quarterly
Oklahoma	Annually	Quarterly
Oregon	January and July	Quarterly
Pennsylvania	Semiannually	Monthly
Rhode Island	Quarterly	Quarterly
South Carolina	Twice annually	Quarterly
South Dakota	Twice annually	Continuously
Tennessee	Quarterly	Continuously
Texas	Twice annually	Five meetings annually
Utah	Once annually	Quarterly
Vermont	Twice annually	Continuously
Virginia	Twice annually	Twice annually
Washington	Twice annually	Twice annually
West Virginia	Twice annually	Quarterly
Wisconsin	January and July	Twice annually and special meetings
Wyoming	Three annually	Three annually
Alaska	On application	On application
Guam	On application	On application
Hawaii	January and July	Continuously
Puerto Rico	Twice annually	Continuously
Virgin Islands	Twice annually	Twice annually

Medical License Fees

Table 25 lists for each state, territory, and outlying possession the fee charged by the medical licensing board for registration by examination and also by reciprocity or endorsement of credentials. The examination fee tends to be uniform, the majority of the boards charging a fee of $25. The fee for a license without examination varies from $20 to $200. Six states—Kansas, Kentucky, Maine,

Minnesota, New Jersey, and Texas—reported an increase in the fee charged for a license by written examination. Six states reported an increase in the fee charged for a license without examination—Connecticut, Indiana, Maine, Minnesota, Texas, and Virginia. Three states have a lower fee for those being certified on the basis of the certificate of the National Board of Medical Examiners than candidates licensed by endorsement of state licenses.

TABLE 24.—*Temporary and Educational Permits, Limited and Temporary Licenses, or Other Certificates Issued by State Licensing Boards*

Arizona	Temporary permit until next board meeting for emergency practice. Restricted license for full or part time practice in federal, state, county, municipal or other health departments, or federal or state hospitals or institutions
Connecticut	Educational permit valid for 1 year for persons ineligible for licensure
Delaware	Temporary emergency licenses for 1 year, subject to renewal. Temporary license issued for from 2 weeks to 4 months to care for practice of licensed physician while ill or absent from the state
Florida	Six month temporary permit granted for practice in emergency in a community unable to obtain a licensed physician
Georgia	State institutions or any state agency and the Medical College of Georgia may employ noncitizen physicians and special permits are granted for 1 year but may be renewed indefinitely
Idaho	Temporary permits granted until next regular session of licensing board
Illinois	Limited licenses for employment as residents in hospitals maintained by the state. Temporary certificates for residency or specialty training in approved Illinois hospitals issued for 1 year's training, but may be renewed.
Indiana	Temporary certificate issued to all reciprocity applicants for 6 months and are renewable pending permanent residence
Iowa	Resident's license for hospital practice issued for 1 year and may be renewed for an additional 3 years
Kansas	Temporary permit for practice up to 6 months until permanent licensure can be obtained
Kentucky	Temporary permits not to exceed 6 months to allow practice until next board meeting. Limited licenses issued for practice for special place, purpose, and need, 1 year, renewable
Louisiana	Temporary permit to foreign-trained physicians pending citizenship
Maine	Temporary licenses granted for residency training, renewable annually. Temporary licenses granted to summer camp doctors for 10 weeks
Massachusetts	Limited registration for interns, fellows, or residents in hospitals or clinics. Issued for a period of 1 year, renewable annually for a period not to exceed 5 years
Michigan	Temporary licensure for graduate training, annual registration not to exceed 5 years
Mississippi	Temporary permit for practice until next board meeting
Nevada	Temporary permit granted for 1 year for residency training
New Hampshire	Temporary permit for locum tenens, emergencies, etc. Time varies
New Jersey	Temporary licenses issued for not less than 2 weeks or more than 4 months
New Mexico	Temporary permit for practice until next board meeting
New York	Temporary certificate for residents in approved hospitals valid for 2 years
North Carolina	Limited licenses issued for duration of residency
Oklahoma	Temporary licenses issued for residency training for 1 year, renewable for 2 additional years
Pennsylvania	Temporary certificates for residency training in approved hospitals in the state, renewable annually
South Dakota	Foreign graduates may serve in an emergency area for four years under a temporary license and reappear before the board for permanent licensure. After July 1, 1955 only those screened through IRO will be eligible
Texas	Temporary permit issued until next board meeting
Virginia	Temporary permit issued until next board meeting
West Virginia	Temporary permits issued until next board meeting to provide medical services where needed
Wisconsin	Temporary educational permits for postgraduate training in approved hospitals in Wisconsin for foreign trained physicians issued for 1 year, renewable for 2 additional years
Alaska	Temporary permits issued while processing permanent licensure, to summer cannery physicians, and to physicians in the armed forces on short tours of duty, valid for 6 months, renewable an additional 6 months
Guam	Restrictive certificate to permit medical employees of federal contractors to practice in the discharge of their official duties
Puerto Rico	Provisional license pending permanent licensure granted foreign-trained physicians to work on charity services
Virgin Islands	Temporary certificates issued to military service personnel on duty and to municipal personnel until next license examination

Licensure on Government Credentials

In most of the states no provision is made in the medical practice acts for the acceptance of credentials issued by the federal government as a basis for licensure without examination. Five boards—California, Illinois, Pennsylvania, Utah, and Guam—have indicated that in their discretion they may accept such credentials under varying regulations.

TABLE 25.—*Medical Licensure Fees*

	Examination	Reciprocity or Endorsement
Alabama	$ 10	$ 50
Arizona	25	100
Arkansas	25	50-100
California	25	100
Colorado	25	50
Connecticut	35	75*
Delaware	25	100
District of Columbia	25	50
Florida	50	...
Georgia	20	50
Idaho	25	100
Illinois	15	25
Indiana	25	100
Iowa	25	50
Kansas	35	50
Kentucky	50	75
Louisiana	25	50
Maine	27	52
Maryland	20	50
Massachusetts	25	50
Michigan	50	100
Minnesota	25	100
Mississippi	10	50
Missouri	25	100
Montana	50	75
Nebraska	25	50
Nevada	100	200
New Hampshire	30	50
New Jersey	50	100
New Mexico	50	50
New York	30	30
North Carolina	50	100
North Dakota	25	50
Ohio	25	50
Oklahoma	25	100†
Oregon	25	100
Pennsylvania	25	50
Rhode Island	20	20
South Carolina	25	50
South Dakota	20	50
Tennessee	35	50
Texas	50	100
Utah	25	50
Vermont	20	50
Virginia	25	100
Washington	25	25
West Virginia	25	100
Wisconsin	45	75-200‡
Wyoming	25	50
Alaska	25	100
Guam	50	50
Hawaii	25	25
Puerto Rico	30	30
Virgin Islands	65	...

* Endorsement of National Board of Medical Examiners Certificate, $35.

† Endorsement of certificate of National Board of Medical Examiners, $25.

‡ Endorsement of certificate of National Board of Medical Examiners and armed forces credentials, $75.

TABLE 26.—*States Requiring Annual Registration*

State	Fee	State	Fee	State	Fee
Arizona	$ 5	Minnesota	$ 2	Tennessee	$ 5
Arkansas	a	Missouri*	5	Texas	5
California	2	Montana	5	Utah	3
Colorado	b	Nebraska	2	Vermont	2
Connecticut	2	Nevada	5	Virginia	1
Dist. of Columbia	4	New Mexico	d	Washington	5
Florida	1†	New York*	6	West Virginia*	2
Georgia	None	North Dakota	e	Wisconsin	3
Idaho	10	Oklahoma	3	Wyoming	2.50
Indiana	c	Oregon	f	Alaska	10
Iowa	3	Pennsylvania	1	Guam	None
Kansas	3	Rhode Island	1	Hawaii	2
Louisiana	10	South Dakota	2	Virgin Islands	50

* Biennial registration.
† Required by State Board of Health.
a. Residents $2, nonresidents $4.
b. Residents $2, nonresidents $10.
c. Residents $5, nonresidents $10.
d. Residents $2, nonresidents $5.
e. Residents $5, nonresidents $2.
f. Residents $15, nonresidents $5.

Annual Registration

Thirty-four states, the District of Columbia, Alaska, Guam, Hawaii, and the Virgin Islands require physicians to register their licenses annually or biennially. In table 26 are listed the licensing boards that exact this requirement and the fee charged for such registration. Rhode Island initiated this requirement in 1954. Some of the states require such registration whether or not physicians reside in the state. The fee charged ranges from $1 to $10. Six states have a nonresident fee. Georgia and Guam do not charge a fee. In Florida physicians are required to register with the state board of health, while Missouri, New York, and West Virginia require biennial registration.

Licensure of Foreign-Trained Physicians

In February, 1950, the Council on Medical Education and Hospitals of the American Medical Association and the Executive Council of the Association of American Medical Colleges first published a list of foreign medical schools whose graduates they recommend for consideration on the same basis as graduates of approved medical schools. This is offered as an advisory

TABLE 27.—FOREIGN MEDICAL SCHOOLS

List Prepared by the Council on Medical Education and Hospitals of the American Medical Association and the Executive Council of the Association of American Medical Colleges

On the basis of information presently available, the Council on Medical Education and Hospitals of the American Medical Association and the Executive Council of the Association of American Medical Colleges are of the opinion that medical institutions and medical organizations in the United States would be justified in considering current and past graduates of the following foreign medical schools on the same basis that they consider graduates of approved medical schools in the United States.

Belgium

Free University of Brussels Faculty of Medicine
(Université Libre de Bruxelles Faculté de Médecine)
Catholic University of Louvain Faculty of Medicine
(Université Catholique de Louvain Faculté de Médecine, or
Katholieke Universiteit te Leuven)
University of Ghent Faculty of Medicine
(Universiteit to Gent Faculteit der Geneeskunde, or
Université de Gand Faculté de Médecine)
University of Liège Faculty of Medicine
(Université de Liège Faculté de Médecine)

Brazil

University of São Paulo Faculty of Medicine
(Universidade de São Paulo Faculdade de Medicina)

China

Peiping Union Medical College

This recommendation applies to all those graduates who were granted the degree of Doctor of Medicine from the date when the first degrees were conferred in 1924 until and including the class of 1943. The education of students in the last class, that of 1943, was interrupted by World War II; therefore, some students finally completed their studies as late as 1949. However, their diplomas were issued as of the class of 1943. Following the Communist conquest of China the name of this school was changed to the China Union Medical College. The recommendation does not apply to this school.

Denmark

University of Copenhagen Faculty of Medicine
(Kobenhavns Universitet Laegevidenskabelige Fakultet)

Finland

University of Helsinki Faculty of Medicine
(Helsingfors Universitet Medicinska Fakulteten)
Medical Faculty Turku University
(Turun Yliopiston Laaketieteellinen Tiedekunta)

Lebanon

American University of Beirut School of Medicine

Netherlands

University of Amsterdam Faculty of Medicine
(Universiteit van Amsterdam Geneeskunde Faculteit)
State University of Groningen Faculty of Medicine
(Rijks-Universiteit te Groningen Geneeskunde Faculteit)
State University of Leiden Faculty of Medicine
(Rijks-Universiteit te Leiden Faculteit der Geneeskunde)
State University of Utrecht Faculty of Medicine
(Rijks-Universiteit te Utrecht Faculteit der Geneeskunde)

The Doctoral Examen that is given at the end of the theoretical part of the study of medicine does not confer the degree of Doctor nor the right to practice medicine. The Arts Examen that is given following the completion of an additional two years of practical work in hospitals confers the title of Doctor and also the right to practice medicine.

Norway

University of Oslo Faculty of Medicine
(Kongelige Frederiks Universitet Medisinske Fakultet)

Sweden

Royal Charles University Medical Faculty, Lund
(Kungl, Karolinska Universitetet Medicinska Fakulteten)
Charles Medico-Surgical Institute, Stockholm
(Karolinska Mediko-Kirurgiska Institutet)
Royal University of Uppsala Medical Faculty
(Kungl. Universitetet i Uppsala Medicinska Fakulteten)

Switzerland

University of Basel Faculty of Medicine
(Universität Basel Medizinische Fakultät)
University of Bern Faculty of Medicine
(Universität Bern Medizinische Fakultät)
University of Geneva Faculty of Medicine
(Université de Genève Faculté de Médecine)
University of Lausanne Faculty of Medicine
(Université de Lausanne Faculté de Mèdecine)
University of Zurich Faculty of Medicine
(Universität Zurich Medizinische Fakultät)

The recommendation with respect to the following medical schools in Switzerland applies only to those graduates of Swiss medical schools who hold the Swiss Federal Diploma issued by the Federal Department of the Interior (Eidgendoissisches Department Des Innern, Département Féderal de L'Intérieur) and obtainable only by Swiss citizens who hold the Certificate of Medical Studies (Akademische Zeugnis, Certificat d'Études Médicales), or who hold one of the following certificates which the Swiss Universities issue to those, not citizens of Switzerland, who complete a course of study and pass examinations equivalent to those taken by Swiss citizens in qualifying for the Swiss Federal Diploma:

University of Basel—Academic Certificate on passing the medical examination for physicians (Akademische Zeugnis über die bestandene Fachprufung für Ärzte).

University of Bern—Medical diploma on passing examination for medicine (Aerztliches Fakultats diplom über die bestandene Fachprufung für Ärzte).

University of Geneva and University of Lausanne—Certificate of Medical Studies (Certificat d'Études Médicales).

University of Zurich—Medical diploma for Foreigners (Medizinisches Diplom für Ausländer).

United Kingdom

England

University of Birmingham Faculty of Medicine
University of Bristol Faculty of Medicine
University of Cambridge Faculty of Medicine
University of Durham Medical School, Newcastle-upon-Tyne
University of Leeds Faculty of Medicine
University of Liverpool Faculty of Medicine
University of London †
University of Manchester Faculty of Medicine
University of Oxford Faculty of Medicine
University of Sheffield Faculty of Medicine

Northern Ireland

Queen's University of Belfast Faculty of Medicine

Scotland

University of Aberdeen Faculty of Medicine
University of Edinburgh Faculty of Medicine
University of Glasgow Faculty of Medicine
University of St. Andrews Medical School, St. Andrews and Dundee

Wales

Welsh National School of Medicine, University of Wales, Cardiff

The recommendation applies only to those physicians trained in the United Kingdom who hold medical degrees from the universities listed. The recommendation does not apply to those physicians who received their medical training at these universities or their affiliated hospital medical schools but who obtained their qualifications through the examinations of the licensing corporations of the United Kingdom. It must be observed, however, that registration in the United Kingdom is granted equally to physicians holding the diplomas of the licensing corporations and to physicians holding university medical degrees.

† Work for the medical degree of the University of London is offered at the following hospital medical schools:

Charing Cross Hospital Medical School
Guy's Hospital Medical School
King's College Hospital Medical School
London Hospital Medical School
Middlesex Hospital Medical School
Royal Free Hospital School of Medicine
St. Bartholomew's Hospital Medical College
St. George's Hospital Medical School
St. Mary's Hospital Medical School
St. Thomas' Hospital Medical School
University College Hospital Medical School
Westminster Hospital Medical School

TABLE 28.—STATUS OF REQUIREMENTS FOR MEDICAL LICENSURE FOR PHYSICIANS TRAINED IN FOREIGN COUNTRIES OTHER THAN CANADA*

	Written Examination Required	Admitted Also on Reciprocal Basis	Citizenship	Basic Science Certificate	Internship in United States	Recognition Limited to Graduates of Schools Accepted by A.M.A. and A.A.M.C.	Additional Requirements	Exemptions	Examination Fee, Dollars
Alabama	x	..	x	..	x	..	x	..	10
Arizona	x	..	1st P	x	x	x	..	x	25
Arkansas	Not accepted								
California	x	..	..	..	x	..	x	x	25
Colorado	x	..	x	x	x	x	x	..	25
Connecticut	x	x	1st P	x	..	..	..	..	35
Delaware	x	..	x	..	x	..	x	..	25
Dist. of Columbia	x	x	..	x	x	x	..	x	25
Florida	x	..	x	x	..	..	x	..	50
Georgia	x	x	x	..	..	x	..	..	20
Idaho	Not accepted								
Illinois	x	..	1st P	..	x	..	x	..	15
Indiana	x	..	..	..	..	..	x	..	25
Iowa	x	..	1st P	x	x	x	x	..	25
Kansas	x	x	x	..	x	..	..	x	35
Kentucky	x	..	x	..	x	..	x	..	50
Louisiana	Not accepted								
Maine	x	x	x	..	x	..	..	..	27
Maryland	x	..	1st P	..	x	..	..	x	20
Massachusetts	x	..	1st P	..	..	..	..	x	25
Michigan	x	..	x	x	x	..	x	..	50
Minnesota	x	..	x	x	x	x	x	..	25
Mississippi	x	..	x	..	..	x	..	..	10
Missouri	x	..	x	..	x	..	..	..	25
Montana	Not accepted								
Nebraska	x	..	x	x	..	x	..	..	25
Nevada	Not accepted								
New Hampshire	x	x	x	..	x	..	..	x	30
New Jersey	x	x	x	..	x	..	x	x	50
New Mexico	x	..	1st P	x	..	x	..	..	50
New York	x	..	1st P	..	..	..	x	..	30
North Carolina	x	..	x	..	..	x	..	x	50
North Dakota	x	..	x	..	x	..	..	x	25
Ohio	x	..	x	..	..	..	..	x	25
Oklahoma	x	..	..	x	x	x	..	..	25
Oregon	Not accepted								
Pennsylvania	x	..	1st P	..	x	x	..	x	25
Rhode Island	x	..	1st P	x	x	..	x	x	20
South Carolina	Not accepted								
South Dakota	x	..	1st P	x	x	..	x	..	20
Tennessee	x	..	x	x	..	x	..	..	35
Texas	Not accepted								
Utah	Not accepted								
Vermont	x	..	x	..	x	..	x	..	20
Virginia	x	..	1st P	..	x	..	x	x	25
Washington	x	..	..	x	..	x	..	..	25
West Virginia	x	..	x	..	x	..	x	..	25
Wisconsin	x	x	1st P	x	x	x	x	..	45
Wyoming	Not accepted								
Alaska	x	x	x	x	..	x	..	..	25
Canal Zone	Not accepted								
Guam	x	x	..	..	x	x	..	..	50
Hawaii	x	..	x	..	x	x	..	x	25
Puerto Rico	Not accepted								
Virgin Islands	x	..	..	..	x	x	x	..	65

This summary should be supplemented by direct communication with the secretary of the licensing board of the state in which the physician is interested.

x Implies yes.

* Graduates of medical schools of Canada considered for licensure on the same basis as graduates of approved medical schools in United States provided they comply with regulations pertaining to citizenship and internship.

Additional Requirements

Alabama. Candidate is eligible if his credentials have been appraised by the National Board of Medical Examiners and approved.

California. Applicant must present documentary evidence, satisfactory to the board (a) of completion in a medical school or schools of a resident course of professional instruction equivalent to that given in an American school, (b) that he is in possession of a medical diploma, (c) that he has been admitted or licensed to practice medicine in the country wherein is located the institution in which he completed his training, and (d) that, if he is not a citizen of the United States, the country in which he has been licensed will admit to practice citizens of the United States. Applicants must pass a written, clinical, and oral examination.

Colorado. Credentials must be submitted in original form and accompanied by translation and will be directly verified or documents should bear evidence of being visaed by the U. S. Consul in the country wherein the school of graduation is or was located.

Delaware. Residence for one year required. Completion of senior year in approved medical school in the United States.

Florida. For graduates of unapproved foreign schools, three year internship and/or residency training in approved hospital is required. Two years may be an internship, but one year must be a residency. Eighteen months or more service in the Medical Corps of the armed forces of the United States accepted as one year internship.

Illinois. Approved rotating internship in Illinois required. Limited license issued for practice in hospitals maintained by the state.

Indiana. Repetition of senior year in approved medical school or two years' postgraduate work in approved hospital in the United States.

Iowa. Internship or one year in medical school in the United States.

Kentucky. Applicant required to complete at least five years' training in the United States in an institution approved by the board and to have successfully passed examination of National Board of Medical Examiners.

Michigan. Completion of senior year in approved medical school in the United States or Canada, or M.S. degree in basic science from a graduate school affiliated with an approved medical school, or, in lieu of above, certificate of an oral comprehensive examination in the basic sciences by a joint screening board of examiners, from the faculties of the medical schools of the University of Michigan and Wayne University.

Minnesota. Two year internship in Minnesota required. Credentials must be submitted in original form and accompanied by translation and will be verified, or documents should bear evidence of being visaed by the United States Consul in the country wherein the school is located.

New Jersey. Original certificate covering medical courses, original diploma and license in foreign country with translation by the Lawyers' and Merchants' Translation Bureau, 11 Broadway, New York City.

Rhode Island. Must pursue postgraduate study or serve additional one year internship or residency. After Jan. 14, 1955 must serve approved rotating internship in Rhode Island. Applicant must be licensed to practice medicine and surgery in country in which school of graduation is located.

South Dakota. Applicant required to practice in an emergency area for four years under a temporary license and reappear before the board for permanent licensure. After July 1, 1955, only those cleared through IRO will be eligible.

Vermont. Must be diplomate of National Board of Medical Examiners.

Virginia. Applicant must be licensed to practice medicine and surgery in country in which school of graduation is located, or must have completed the course of study and passed examinations equivalent to those required for a diploma or license conferring such full right to practice.

West Virginia. Applicant must be resident of the state for three years preceding application and be recommended by local medical society.

Wisconsin. 1953 Legislature established One Year Temporary Educational Permit, which authorizes graduates of unapproved foreign schools to obtain residency training in approved hospitals. May be renewed for two additional years.

Virgin Islands. Residence of six months required.

Exemptions

District of Columbia. Considered for reciprocal or endorsement registration on an individual basis.

Illinois. Graduates of European medical colleges or universities after Jan. 1, 1943, with the exception of certain approved colleges in the British Isles, Denmark, Holland, Norway, Sweden, and Switzerland, will not be accepted after July 1, 1954. However, graduates of such European medical colleges after Jan. 1, 1943, may be considered providing they present diplomas of graduation from approved medical colleges in the United States after attendance in such colleges for at least one year, and, in addition, have served rotating internship of one year in an approved hospital in Illinois.

Kansas. Applicant must be licensed to practice in country of graduation. Application must be filed one year in advance.

Maryland. Graduates of recommended medical schools may be accepted after completion of one year of internship or residency in an approved hospital in the United States if their credentials have been approved and they have presented at least two letters, recommending them as to their professional ability and moral character, from the hospital authorities.

Graduates, not on the recommended list, who obtained the medical degree after Jan. 1, 1940, are not eligible.

Graduates of foreign medical schools, before Jan. 1, 1940, whose schools were known to have had acceptable standards at the time of graduation may be considered if credentials and professional experience in the United States are acceptable to the board.

Graduates of Latin American schools not on the recommended list referred to in the first paragraph above are not eligible.

Ability to write and speak English clearly is a primary requisite.

Massachusetts. Graduates of foreign medical schools who matriculated in medical school prior to Jan. 1, 1941, are eligible to apply for admission to the examinations. Graduates after Jan. 1, 1941, must be graduates of a medical school approved by the Approving Authority for Colleges and Medical Schools of the Commonwealth of Massachusetts. The board has approved the School of Physic, Trinity College, Dublin, Ireland, and the University of London.

New Hampshire. Diplomates of National Board of Medical Examiners eligible on reciprocity basis. Temporary license valid until citizenship is completed may be given. Considered on an individual basis.

New Jersey. Internship completed in foreign countries after July 1, 1934, not acceptable. Acceptance limited to schools recognized by the board. Considered on an individual basis. After Jan. 1, 1955 must have minimum of three years' training in a hospital approved by the board.

New York. Considered on an individual basis.

North Carolina. Considered on an individual basis.

North Dakota. Not accepted unless certified by an American specialty board. Considered on an individual basis.

Ohio. Graduates of schools of Continental Europe after 1943 are eligible if on accepted list. If not licensed in a foreign country must have one year in hospital in the United States; if not on accepted list, two years of training in an approved hospital in the United States. Considered on individual basis.

Pennsylvania. Medical schools in China and Japan acceptable.

Rhode Island. Matriculants in foreign medical faculties subsequent to Jan. 1, 1949, not acceptable unless applicant was a legal resident of Rhode Island at the time of matriculation at a foreign medical school and obtained his preprofessional training in the United States or Canada.

Texas. European graduates after 1939 limited to English speaking schools.

Virginia. Graduates of medical schools on accepted list admitted on same basis as approved medical schools in United States. Graduates of other schools having the required length of study and diploma required for practice in the country of their graduation, two years of internship in approved hospital in United States or Canada within past five years prior to application, or one year of study in an approved medical school in lieu of one year of the internship may be considered for examination. If United States citizenship has not been acquired in seven years, license becomes invalid.

Hawaii. Diplomates of National Board eligible on reciprocity basis.

Marginal Number		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
		Alabama		California		Colorado		Connecticut		Delaware		Dist. of Columbia		Florida		Georgia		Illinois		Indiana		Iowa		Kansas		Louisiana		Maine		Maryland	
	SCHOOL	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F
	ARGENTINA																														
1	Universidad Nacional de Buenos Aires	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1
2	Universidad Nacional del Litoral, Rosario	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
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3	University of Sydney Medical School	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0
4	University of Queensland Medical School	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	AUSTRIA																														
5	Karl-Franzens-Universität, Graz	..	..	1	0	..	..	0	1	..	..	..	..	0	1	..	..	7	5	..	..	..	..	..	..	..	..	..	..	0	1
6	Leopold Franzens-Universität, Innsbruck	..	..	0	1	..	..	..	..	..	..	1	0	..	..	..	..	8	5	..	..	1	0	..	..	..	..	..	..	..	..
7	Universität Wien	..	..	4	4	..	..	0	2	..	..	..	..	..	..	..	..	5	4	..	..	..	..	..	..	..	..	..	..	2	0
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8	Univerité Bruxelles	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..
9	Université Gent	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..
10	Université de Liège	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..
11	Université Catholique de Louvain Faculté de Médecine	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..
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12	Faculdade de Medicine Cirurgia e Pharmacia, Bahia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	Universidade de Sao Paulo	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	Faculdade de Medicine e Cirurgia do Para	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
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15	University of Sofia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	3	..	..	..	..	..	..	..	..	..	..	..	..
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16	Universidad de Chile, Santiago	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..
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17	Peiping Union Medical College	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..
18	Canton University Medical Department	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	South China Medical College, Canton	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..
20	Hsiang Ya Medical College, Changsha	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..
21	Pennsylvania Medical School, Shanghai	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	0	..	..	..	..	..	..	..	..	..	..
22	Cheeloo University School of Medicine, Shantung	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	Women's Christian Medical College, Shanghai	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
24	National College of Medicine of Shanghai	..	..	3	1	..	..	..	..	..	..	..	..	..	..	3	0	..	..	2	1	1	0	..	..	..	..	..	..	1	0
25	West China Union University School of Medicine, Chengtu, Szechwan	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0
26	College of Medicine, National Sun Yat-Sen University, Canton	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	Aurora University French School of Medicine, Shanghai	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	National Central University College of Medicine, Nanking	..	..	2	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	Tung Nan Medical College, Shanghai	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..
30	Tung Nan Chi University, College of Medicine, Ahgnhai, Kiangsu	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	National Kiangsu Medical College, Chengkiang, Kiangsu	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	National Kweiyang Medical College, Kweiyang, Kweichow, China	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	Lanchow University Medical College, Lanchow, Kansu	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..
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34	Severance Union Medical College, Keijo	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
35	Keijo Medical College, Keujo	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1
	COLOMBIA																														
36	Universidad Nacional Facultad de Medicine, Bogota	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37	Universidad de Antioquia Facultad de Medicina, Medellin	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	CUBA																														
38	Universidad de la Habana	1	0	2	1	..	..	0	1	..	..	..	..	6	3	1	0	12	17	2	1	1	0	..	..	..	..	..	..	1	1
	CZECHOSLOVAKIA																														
39	Deutsche Universität, Prag	..	..	2	0	..	..	..	..	..	..	..	..	0	1	..	..	0	2	..	..	..	..	..	..	..	..	0	1	..	..
40	Universita Karlova, Praha	..	..	1	1	..	..	0	1	..	..	..	..	..	..	..	..	4	8	..	..	..	..	..	..	..	..	0	1	0	2
41	Univerzita Komenskeho, Bratislava	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
42	Masarykova Universita, Brno	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
	DENMARK																														
43	Kobenhavns Universitet	..	..	2	0	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	0	1
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44	Universidad de Santo Domingo	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
	ECUADOR																														
45	Universidad Central Facultad de Ciencias Medicas, Quito	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	0	1	..	..	..	..	..	..	..	..	..	..
	EGYPT																														
46	Egyptian University Faculty of Medicine, Cairo	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..
	EL SALVADOR																														
47	Universidad de El Salvador, San Salvador	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	ENGLAND																														
48	University of Birmingham	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0
49	University of Bristol	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0
50	University of Cambridge	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..
51	University of Durham Medical School, Kings College	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
52	University of Leeds	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
53	University of Liverpool	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
54	University of London	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	4	0
55	Kings College (London)	..	..	1	0	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
56	University of Manchester	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
57	University of Oxford	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	0	..	..	..	..	..	..	..	..	..	..	..	..
58	Licentiate Royal College of Physicians of London and Member Royal College of Surgeons of England	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..
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59	Tartu Ulikooli	..	..	2	0	..	..	..	..	..	..	..	..	..	..	..	..	4	3	..	..	..	..	..	..	..	..	..	..	2	1
	FINLAND																														
60	Helsingfors Universitet	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Massachusetts	Michigan	Minnesota	Mississippi	Missouri	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Pennsylvania	Rhode Island	South Dakota	Tennessee	Texas	Virginia	Washington	West Virginia	Wisconsin	Hawaii and Puerto Rico	Totals	Examined—Passed	Examined—Failed	Percentage Failed	Number of Boards Examined by
P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F					Marginal Number
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2 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	12 10	.. ..	.. ..	4 1	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	52	30	22	42.3	8	7
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1 0	2 0	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	1 0	1 0	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	10	10	0	0.0	8	21
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.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	30
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	0	1	100.0	1	31
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	1	1	50.0	1	32
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	33
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	0	1	100.0	1	34
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	0	1	100.0	1	35
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	36
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	37
0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	4 3	.. ..	.. ..	1 0	.. ..	2 0	.. ..	.. ..	5 5	.. ..	.. ..	.. ..	.. ..	.. ..	71	38	33	46.5	14	38
.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	4 3	.. ..	.. ..	0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	15	7	8	53.3	7	39
0 1 1	0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	6 5	.. ..	.. ..	3 3	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	37	15	22	59.5	9	40
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	0 3	.. ..	.. ..	0 1	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	7	2	5	71.4	4	41
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	1	1	50.0	2	42
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	8	6	2	25.0	6	43
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2 4	.. ..	.. ..	.. ..	.. ..	0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	7 1	17	10	7	41.2	3	44
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	0	2	100.0	2	45
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	46
.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	2	0	0.0	2	47
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	2	0	0.0	2	48
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	49
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	50
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	3	3	0	0.0	3	51
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	52
.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	0 1	.. ..	.. ..	1 0	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	5	4	1	20.0	5	53
.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	1 0	4 0	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	13	13	0	0.0	7	54
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	2	0	0.0	2	55
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	56
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	2	0	0.0	1	57
..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2 0	.. ..	.. ..	3 0	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	8	8	0	0.0	5	58
.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	2 5	.. ..	.. ..	0 1	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	22	12	10	45.5	7	59
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	60
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

Marginal Number	SCHOOL	Alabama P	Alabama F	California P	California F	Colorado P	Colorado F	Connecticut P	Connecticut F	Delaware P	Delaware F	Dist. of Columbia P	Dist. of Columbia F	Florida P	Florida F	Georgia P	Georgia F	Illinois P	Illinois F	Indiana P	Indiana F	Iowa P	Iowa F	Kansas P	Kansas F	Louisiana P	Louisiana F	Maine P	Maine F	Maryland P	Maryland F
	FRANCE																														
61	Université de Lyon	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
62	Université de Montpelier	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
63	Université de Nancy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
64	Université de Paris	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	1	0	..	..	2	3	..	..
65	Université de Toulouse	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
66	Université de Strasbourg	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
	GERMANY																														
67	Friedrich-Wilhelms-Universität, Berlin	..	..	2	1	..	..	1	0	..	..	..	..	1	0	..	..	3	0	..	..	1	0	..	..	..	..	..	..	1	0
68	Rheinische Friedrich-Wilhelms Universität, Bonn	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	3	4	..	..	..	..	..	..	..	..	..	..	..	..
69	Schlesische-Friedrich-Wilhelms Universität, Breslau	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	0	4	..	..	..	..	..	..	..	..	..	..	..	..
70	Friedrich-Alexanders-Universität, Erlangen	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	14	12	..	..	..	..	..	..	..	..	..	..	1	0
71	Albert-Ludwigs-Universität, Freiburg	..	..	0	1	..	..	0	1	..	..	..	..	..	..	..	..	3	2	..	..	..	..	..	..	..	..	..	..	..	..
72	Hessische Ludwigs-Universität, Giessen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
73	Georg-August-Universität, Göttingen	..	..	0	1	..	..	0	2	..	..	..	..	..	..	..	..	3	2	1	0	..	..	..	..	..	..	..	..	..	..
74	Ernst-Moritz-Arndt Universität, Greifswald	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
75	Martin Luther Universität, Halle-Wittenberg	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
76	Universität Heidelberg	..	..	2	1	..	..	..	..	..	..	..	..	0	1	..	..	9	9	..	..	..	..	..	..	..	..	..	..	1	0
77	Thuringische Landesuniversität, Jena	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..
78	Christian-Albrecht-Universität, Kiel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..
79	Albertus-Universität, Königsberg	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
80	Universität Leipzig	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	0	1
81	Philipps-Universität, Marburg	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	4	..	..	..	..	..	..	..	..	..	..	1	0
82	Ludwig-Maximillians-Universität, München	..	..	4	4	..	..	..	..	..	..	..	..	..	..	..	..	26	23	..	..	..	..	..	..	..	..	..	..	0	1
83	Universität Rostock	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
84	Eberhard-Karls-Universität, Tübingen	..	..	1	0	..	..	..	..	..	..	..	..	1	0	..	..	12	8	..	..	0	1	..	..	..	..	..	..	..	..
85	Julius-Maximilians-Universität, Würzburg	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	2	5	..	..	..	..	..	..	..	..	..	..	0	1
86	Hamburgische Universität, Hamburg	..	..	3	3	..	..	..	..	..	..	..	..	..	..	..	..	4	6	..	..	..	..	..	..	..	..	..	..	..	..
87	Universität, Köln	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
88	Johann Wolfgang Goethe-Universität, Frankfurt-am-Main	..	..	2	0	..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	..	..	..	..	..	..	..	..	..
89	Westfalishe Wilhelms-Universität, Münster	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	..	1	0
90	Medizinische Akademie Düsseldorf	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..
91	Medizinische Fakultat der Frein Universität, Berlin	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..
92	Medizinische Fakultat der Johannes Guttenberg-Universität, Mainz	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
	GREECE																														
93	National University of Athens	..	..	0	3	..	..	..	..	..	..	..	..	0	2	..	..	2	3	..	..	..	..	..	..	..	..	1	1	0	1
	GUATEMALA																														
94	Universidad Nacional de Guatemala	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	HAITI																														
95	Ecole Nationale, Port-au-Prince	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	1	..	..	..	..	..	..	..	..	..	..	..	..
	HUNGARY																														
96	Magyar Kiralyi Pazmany Petrus Tudomanyegyetum, Budapest	..	..	1	2	..	..	2	1	..	..	..	..	..	..	..	..	5	6	..	..	..	..	..	..	..	..	0	1	1	1
97	Magyar Kiralyi Ferency Josef Tudomanyegyetum, Szeged	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
98	Magyar Kiralyi Erzebet Tudomanyegyetum, Pecs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..
99	Magyar Kiralyi Tisza-Istvan Tudomanyegyetum, Debrecen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	2
	ICELAND																														
100	Haskoll Islands Laee Knadeildin, Reykjavik	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	0	..	..	..	..	..	..	..	..	..	..	..	..
	INDIA																														
101	University of Calcutta	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
102	Ayurvedic College, Benares	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..
	IRAN																														
103	Madresseh Teb, Teheran	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	0	..	..	..	..	..	..	0	1	..	..
	IRAQ																														
104	Royal Iraq Medical College, Bagdad	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	IRELAND																														
105	Queen's University, Belfast	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	1	0	..	..	..	..
106	National University of Ireland	..	..	2	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	0	4	1
107	University of Dublin	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..
108	Schools of Surgery, Royal College of Surgeons in Ireland, Dublin	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	0	..	..
109	Licentiate of the Royal College of Physicians of Ireland and Licentiate of the Royal College of Surgeons of Ireland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	ITALY																														
110	Regia Università di Bologna	..	..	0	1	..	..	..	..	1	0	..	..	..	..	..	..	13	6	..	..	..	..	..	..	..	..	0	1	..	..
111	Regia Università di Milano	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..
112	Regia Università di Catania	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..
113	Regia Università di Firenze	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..
114	Regia Università di Genova	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	2	..	..
115	Regia Università di Messina	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
116	Regia Università di Modena	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
117	Regia Università di Napoli	..	..	1	0	..	..	0	2	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	1	1	..	..
118	Regia Università di Padova	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
119	Regia Università di Palermo	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	0	1	..	..
120	Regia Università di Pavia	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
121	Regia Università di Perugia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
122	Regia Università di Pisa	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
123	Regia Università di Roma	..	..	2	3	..	..	1	2	..	..	..	..	..	..	..	..	2	5	..	..	..	..	..	..	..	..	0	1	..	..
124	Regia Università di Sassari	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
125	Regia Università di Siena	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
126	Regia Università di Torino	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	0	1	..	..
127	Regia Università di Bari	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
	JAPAN																														
128	Osaka Imperial University, Osaka	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..
129	Keio Gijuku University Medical College, Tokyo	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
130	Japan University Medical Department, Kanda, Tokyo	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	LATVIA																														
131	Latvijas Universitate, Riga	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	5	4	..	..	1	1	..	..	..	..	..	..	..	..
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
Massachusetts	Michigan	Minnesota	Mississippi	Missouri	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Pennsylvania	Rhode Island	South Dakota	Tennessee	Texas	Virginia	Washington	West Virginia	Wisconsin	Hawaii and Puerto Rico	Totals	Examined—Passed	Examined—Failed	Percentage Failed	Number of Boards Examined by	Marginal Number
P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F						
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Marginal Number	SCHOOL	1 Alabama P	F	2 California P	F	3 Colorado P	F	4 Connecticut P	F	5 Delaware P	F	6 Dist. of Columbia P	F	7 Florida P	F	8 Georgia P	F	9 Illinois P	F	10 Indiana P	F	11 Iowa P	F	12 Kansas P	F	13 Louisiana P	F	14 Maine P	F	15 Maryland P	F
	LEBANON																														
132	American University of Beirut	..	..	1	1	..	..	..	..	..	..	1	0	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	4	0
133	Faculté Française de l'Université de St. Joseph, Beyrouth	..	..	..	..	..	..	..	..	..	..	..	..	2	0	..	..	1	0	..	..	..	..	..	..	..	..	0	1	1	0
	LITHUANIA																														
134	Vytauto Didzijo Universiteto, Kaunas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	19	23	..	..	..	..	..	..	..	..	..	..	3	0
	MANCHUKUO																														
135	Mukden Medical College, Mukden	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
	MEXICO																														
136	Universidad Nacional, Mexico City	..	..	3	3	..	..	..	..	..	..	..	..	1	1	..	..	0	3	..	..	..	..	..	..	..	..	..	..	..	..
137	Escuela de Medicina de Nuevo Leon, Monterrey	..	..	0	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	0	..	..	..	..	..	..	..	..	..	..
138	Universidad de Guadalajara	..	..	3	4	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
139	Escuela de Medicina de San Luis Potosi	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
140	Escuela Medico Militar, Mexico City	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
141	Universidad Libre Mexicana, Mexico City	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
142	National Autonomous University of Mexico, Mexico City	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
143	Escuela Nacional de Medicine Homeopatica del Instituto Politecnico Nacional, Mexico City	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	NETHERLANDS																														
144	Universiteit van Amsterdam	..	..	1	0	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
145	Rijks-Universiteit te Leiden	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	1	0
146	Rijks-Universiteit te Utrecht	..	..	1	0	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..
	NICARAGUA																														
147	Universidad de Nicaragua Facultades de Medicine en Leon y en Granada	..	..	0	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	NORWAY																														
148	Kongelige Frederiks Universitet, Oslo	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	PERU																														
149	Universidad Mayor de San Marcos de Lima Facultad de Medicina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	2	..	..	..	..	..	..	..	..	..	..	..	..
	PHILIPPINES																														
150	University of Santo Tomas, Manila	..	..	0	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1
151	University of the Philippines, Manila	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	1	0	1	0
	POLAND																														
152	Uniwersytet Jagiellonski Wydzial Lekarski, Cracow	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
153	Uniwersytet Jana Kazimierza Wydzial Lekarski, Lwow (Lemberg)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	4	..	..	..	..	..	..	..	..	..	..	..	..
154	Uniwersytet Jozefa Pilsudskiego, Warsaw	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	0	1
155	Uniwersytet Poznanski Wydzial Lekarski, Poznan	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
156	Uniwersytet Stefana Batorego Wydzial Lekarski, Wilno	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..
	PORTUGAL																														
157	Universidade do Porto	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	RUMANIA																														
158	Universitatea din Bucuresti	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
	SCOTLAND																														
159	University of St. Andrew's, St. Andrew and Dundee	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..
160	University of Edinburgh	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
161	University of Glasgow	..	..	1	0	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
162	Licentiate of the Royal College of Physicians of Edinburgh, Licentiate of the Royal College of Surgeons of Edinburgh, Licentiate of the Royal Faculty of Physicians and Surgeons of Glasgow	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
163	Polish School of Medicine, Edinburgh	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0
	SOUTH AFRICA																														
164	University of Witwatersrand, Johannesburg	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0
165	University of Cape Town, Cape Town	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0
	SPAIN																														
166	Universidad de Barcelona	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
167	Universidad Central de Espana, Madrid	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..
168	Universidad de Valencia Facultad de Medicina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	SWITZERLAND																														
169	Universität Basel	..	..	2	0	..	..	..	..	..	..	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..
170	Universität Bern	..	..	1	0	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..
171	Université de Genève	..	..	1	0	..	..	2	0	..	..	2	0	..	..	..	..	1	0	..	..	..	..	..	..	..	..	..	..	1	0
172	Université de Lausanne	..	..	3	0	..	..	..	..	..	..	..	..	1	0	..	..	1	0	..	..	..	..	..	..	..	..	..	..	2	0
173	Universität Zurich	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	0
	TURKEY																														
174	University of Istanbul	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	1
	UNION OF SOCIALIST SOVIET REPUBLICS																														
175	Voronezh Medical Institute	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
176	Kharkov Medical Institute	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	0	1
177	Kiev Medical Institute	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
178	First Moscow Medical Institute	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
179	Odessa Medical Institute	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
180	University of Tomsk Faculty of Medicine	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
181	Military Medical Academy, Leningrad	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
182	Samarkand Institute of Medicine, Samarkand, Uzbekistan	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	WALES																														
183	Welsh National School of Medicine, Cardiff	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	YUGOSLAVIA																														
184	Zagrebasko Universiteta, Zagreb	..	..	0	1	..	..	..	..	..	..	..	..	..	..	..	..	0	1	..	..	..	..	..	..	..	..	..	..	1	0
185	Beogradskog Universiteta, Beograd	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	3	..	..	..	..	..	..	..	..	..	..	..	..
	ISRAEL																														
186	Hadassah Medical School, Jerusalem	..	..	1	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
187	**Totals**	2		156		1		30		1		6		24		6		435		26		8		1		3		34		64	
188	**Totals—Examined—Passed**	2		83		1		13		1		6		13		6		216		20		5		1		3		16		44	
189	**Totals—Examined—Failed**	0		73		0		17		0		0		11		0		219		6		3		0		0		18		20	
190	**Percentage Failed**	0.0		46.8		0.0		56.7		0.0		0.0		45.8		0.0		50.3		23.1		37.5		0.0		0.0		52.9		31.2	
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
Massachusetts	Michigan	Minnesota	Mississippi	Missouri	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Pennsylvania	Rhode Island	South Dakota	Tennessee	Texas	Virginia	Washington	West Virginia	Wisconsin	Hawaii and Puerto Rico	Totals	Examined—Passed	Examined—Failed	Percentage Failed	Number of Boards Examined by	Marginal Number
P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F						
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.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2	2	0	0.0	2	165
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	0	1	100.0	1	166
0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	0 1	4	1	3	75.0	4	167
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	168
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	2 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	5	5	0	0.0	3	169
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	3 3	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	10	5	5	50.0	4	170
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	3 0	1 0	.. ..	4 0	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	17	17	0	0.0	10	171
0 1	.. ..	.. ..	1 0	1 0	.. ..	.. ..	.. ..	2 2	.. ..	.. ..	0 2	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	16	11	5	31.3	9	172
.. ..	2 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	6	6	0	0.0	3	173
.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 1	.. ..	.. ..	2 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	6	4	2	33.3	4	174
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	0	1	100.0	1	175
.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	6	4	2	33.3	4	176
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	0 1	.. ..	.. ..	2 1	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	5	3	2	40.0	3	177
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	0 3	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	3	0	3	100.0	1	178
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	0 2	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	4	1	3	75.0	3	179
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	0	1	100.0	1	180
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	181
.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	182
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 0	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	183
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 2	.. ..	.. ..	0 1	.. ..	0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	8	2	6	75.0	6	184
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1 1	.. ..	.. ..	0 1	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	7	2	5	71.4	3	185
.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	1	1	0	0.0	1	186
21	25	18	1	4	5	19	3	413	8	2	175	12	42	4	1	20	30	5	1	4	32	1,642	..	..	....	609	187
7	25	17	1	4	4	19	3	184	8	0	117	12	34	2	1	14	23	5	1	3	29	...	943	..	....	..	188
14	0	1	0	0	1	0	0	229	0	2	58	0	8	2	0	6	7	0	0	1	3	...	..	699	....	..	189
66.7	0.0	5.6	0.0	0.0	20.0	0.0	0.0	55.4	0.0	100.0	33.1	0.0	19.0	50.0	0.0	30.0	23.3	0.0	0.0	25.0	9.4	...	..	..	42.6	..	290
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	

list for the use of any agency or organization that finds it helpful. In the preparation of this initial list and its three subsequent revisions, these agencies have had the cooperation of the Advisory Committee on Foreign Medical Credentials, made up of a large group of outstanding persons representing medical education, educational foundations, licensing bodies, various governmental agencies, and other organizations interested in the problem of foreign-trained physicians.

The current list, revised to February, 1953, is contained in table 27. The position of the Council with respect to schools not named in the list is that they neither approve nor disapprove of them. The credentials of graduates of schools not listed must be evaluated by those other agencies, organizations, or institutions to whom graduates of the institutions apply for recognition. Fifty schools in 14 countries are included in the listing.

TABLE 30.—*Physicians Examined on the Basis of Credentials Obtained in Countries Other Than the United States and Canada, 1950-1954*

Year	Number Examined	Passed	Percentage Failed
1930	167	92	44.9
1931	158	91	42.4
1932	182	96	47.3
1933	200	129	35.5
1934	285	170	40.2
1935	437	303	30.7
1936	588	382	35.0
1937	920	637	30.8
1938	1,164	716	38.5
1939	1,691	839	50.4
1940	2,088	948	54.7
1941	1,717	698	59.2
1942	1,630	890	45.4
1943	1,031	518	49.8
1944	691	325	53.0
1945	475	209	56.0
1946	495	221	55.3
1947	601	283	52.9
1948	639	311	51.3
1949	737	319	56.7
1950	799	359	55.0
1951	1,006	524	47.9
1952	1,208	648	46.3
1953	1,463	796	46.3
1954	1,642	943	42.6
Totals	22,014	11,447	52.0

In 1954 there was formed a Cooperating Committee on Graduates of Foreign Medical Schools, including representation from the Federation of State Medical Boards of the United States, the Council on Medical Education and Hospitals of the American Medical Association, the Association of American Medical Colleges, and the American Hospital Association. This Cooperating Committee is currently developing a program for the evaluation of foreign-trained physicians.

The present requirements for foreign-trained physicians seeking medical licensure in the United States and its territories and outlying possessions are given in table 28. Foreign-trained physicians are not eligible for licensure in 10 states, the Canal Zone, and Puerto Rico. Seventeen licensing boards stipulate that recognition is limited to graduates of the schools on the accepted list of foreign medical schools. Other boards find that list useful in the evaluation of credentials. Six boards do not require citizenship, while 23 boards require full citizenship. Thirteen boards require that the applicant declare his intention of becoming a citizen. Twenty-nine boards indicate the foreign-trained physician must serve an internship or obtain further medical training in the United States. In addition to the items tabulated in this table, 19 boards have other specific requirements for foreign-trained physicians and 16 boards reported varying exemptions. Columns 7 and 8 of table 28 refer to the boards that have additional requirements and exemptions. The factual data pertaining to these regulations are included in the text immediately below the table.

TABLE 31.—*Graduates of Foreign Medical Faculties Representing Additions to the Medical Profession, 1954*

	Examination	Reciprocity and Endorsement	Total
Alabama	1	0	1
California	63	0	63
Colorado	3	0	3
Connecticut	13	2	15
Delaware	1	0	1
District of Columbia	4	2	6
Florida	2	0	2
Georgia	4	0	4
Illinois	203	0	203
Indiana	18	2	20
Iowa	3	0	3
Kansas	1	0	1
Maine	13	2	15
Maryland	32	1	33
Massachusetts	6	1	7
Michigan	1	1	2
Minnesota	16	0	16
Mississippi	1	0	1
Missouri	1	1	2
New Hampshire	4	2	6
New Jersey	17	1	18
New Mexico	3	0	3
New York	168	4	172
North Carolina	6	0	6
Ohio	68	2	70
Oregon	1	0	1
Pennsylvania	5	0	5
Rhode Island	32	0	32
South Dakota	2	0	2
Texas	8	0	8
Virginia	16	0	16
Washington	4	2	6
Wisconsin	3	0	3
Hawaii	1	0	1
Puerto Rico	25	0	25
Totals	749	23	772

TABLE 32.—*Additions to the Medical Profession Representing Graduate of Foreign Medical Faculties, 1950-1954*

	Examination	Reciprocity and Endorsement	Totals
1950	267	41	308
1951	425	25	450
1952	545	24	569
1953	662	23	685
1954	749	23	772
Totals	2,648	136	2,784

This chart was developed by the Council on Medical Education and Hospitals of the American Medical Association in an effort to assist the foreign-trained physician seeking licensure in the United States. While an attempt has been made to present the situation as it exists, the table is intended to give only a summary of existing requirements. Persons interested in licensure should supplement these data by communicating with

the licensing boards. Medical licensure in the United States is a "state right" and is entirely under the jurisdiction of the governments of the individual states. The power to license physicians is exercised through the medical licensing boards of each state. Official information concerning the acceptability of foreign credentials should be obtained directly from the licensing boards.

Table 29 records the number of graduates of foreign faculties of medicine examined for medical licensure by 38 boards in 1954. The figures include both American and foreign-born physicians. Graduates of 183 medical schools and 3 licensing corporations were examined. Graduates of medical schools in the Philippines, Iceland, 14 South and Central American countries, 26 countries in Europe, and 13 in Asia were represented at examinations. The number totaled 1,642. The number who were successful was 943; failures numbered 699, or 42.6%. There were more than 30 graduates of 11 schools examined during the year. The University of Munich in Germany represented the largest group from any one school; 85 graduates of this school were examined in 11 states, of whom 49 passed and 36, or 42.4%, failed. From Central America the school represented by the largest group was the University of Havana; 71 graduates of this school were examined in 14 states, with 46.5% failures.

The greatest number examined in any one state was 435 in Illinois, of whom 216 passed and 219, or 50.3%, failed. New York examined 413, of whom 184 passed and 229, or 55.4%, failed. There were 175 examined in Ohio, 117 passed and 58, or 33.1%, failed and 156 in California, of whom 83 and 73, or 46.8%, failed. Other states examined fewer than 65.

Table 30 presents the number of graduates of foreign faculties of medicine examined for medical licensure in the United States in 25 years (1930-1954). In 1936 the number of foreign-trained physicians seeking licensure in this country began to increase, and by 1940 over three times as many were tested as in 1936. Beginning in 1944, the numbers examined decreased until 1951, when there was a noticeable increase. In each succeeding year the numbers examined has increased. In 1954 the increase over the previous year was 179. At no time in the 25 year period did fewer than 30.7% fail in a given year.

In table 31 are recorded figures regarding foreign-trained physicians who were not previously licensed in the United States and therefore are additions to the medical profession. There were 772 in this group, 749 of whom were licensed after written examination and 23 by endorsement of credentials. Similar figures for the previous four years (1950-1953) together with the figures for 1954 are given in table 32. In this five year period 2,784 foreign-trained physicians were added to the physician population of the United States, 2,648 obtaining licensure by written examination and 136 by endorsement of credentials.

CORRESPONDING OFFICERS OF STATE BOARDS OF MEDICAL LICENSURE

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New York	Dr. Stiles D. Ezell, Secretary, 23 S. Pearl St., Albany 7
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Texas	Dr. M. H. Crabb, Secretary, 1714 Medical Arts Bldg., Fort Worth 2
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Alaska	Dr. W. M. Whitehead, Secretary, 172 S. Franklin St., Juneau
Canal Zone	Dr. Don Longfellow, Health Director, Balboa Heights
Guam	Dr. Benedict Cooper, Executive Secretary, Guam Memorial Hospital, Agana
Hawaii	Dr. I. L. Tilden, Secretary, 1020 Kapiolani St., Honolulu
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Virgin Islands	Dr. Earle M. Rice, Secretary, St. Thomas

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Basic science laws currently exist in 19 states, the District of Columbia, and Alaska. These laws provide for the establishment of a board of examiners in the basic sciences whose function is to determine the adequacy of background knowledge of basic science of all candidates seeking licensure to practice in any of the healing arts within the confines of the state, district, or territory in question. The basic science boards have no licensing power, but a certificate indicating successful completion of their examinations is a prerequisite for licensure wherever such boards exist. Table 33 lists the states, district, and territory where basic science laws exist and the year of their enactment.

The basic sciences designated in the legislation vary with the different laws. All of them include anatomy, pathology, and physiology, and the majority include bacteriology and chemistry. Ten include hygiene, two diagnosis, and one requires public health. Through legislative amendment in 1955 bacteriology will also be included in the basic science examinations in Washington after July 1, 1956. Table 34 lists the basic science boards and the subjects in which examinations are required.

The laws in some states provide for certification without examination by exemption, waiver, reciprocity, or endorsement. The credentials acceptable for certification by one of these methods are outlined in table 35. The Washington Basic Science Law amendment now provides for certification by waiver. The details of the waiver are outlined in this table.

The results of examinations given and the number of certificates issued on the basis of waiver, exemption, reciprocity or endorsement as reported by the basic sci-

TABLE 33.—*States Having Basic Science Laws and Year of Enactment*

Alaska	1946	Nevada	1951
Arizona	1936	New Mexico	1941
Arkansas	1929	Oklahoma	1937
Colorado	1937	Oregon	1934
Connecticut	1925	Rhode Island	1940
District of Columbia	1929	South Dakota	1939
Florida	1939	Tennessee	1943
Iowa	1936	Texas	1949
Michigan	1937	Washington	1927
Minnesota	1927	Wisconsin	1925
Nebraska	1927		

TABLE 34.—*Subjects Included in Basic Science Examinations*

	Anatomy	Bacteriology	Chemistry	Diagnosis	Hygiene	Pathology	Physiology	Public Health
Alaska	x	x	x	..	x	x	x	..
Arizona	x	x	x	..	x	x	x	..
Arkansas	x	x	x	..	x	x	x	..
Colorado	x	x	x	..	..	x	x	..
Connecticut	x	..	..	x	x	x	x	..
District of Columbia	x	x	x	..	..	x	x	..
Florida	x	x	x	..	..	x	x	..
Iowa	x	x	x	..	x	x	x	..
Michigan	x	x	x	..	..	x	x	..
Minnesota	x	x	x	..	x	x	x	..
Nebraska	x	x	x	..	x	x	x	..
Nevada	x	x	x	..	..	x	x	..
New Mexico	x	x	x	..	..	x	x	..
Oklahoma	x	x	x	..	..	x	x	..
Oregon	x	..	x	..	x	x	x	..
Rhode Island	x	x	x	..	..	x	x	..
South Dakota	x	x	x	..	..	x	x	..
Tennessee	x	x	x	..	..	x	x	..
Texas	x	x	x	..	x	x	x	x
Washington *	x	..	x	..	x	x	x	..
Wisconsin	x	..	..	x	..	x	x	..

* By amendment (1955) bacteriology will be included in the Washington basic science examination after July 1, 1956.

TABLE 35.—*Reciprocity, Endorsement, Waiver, or Exemption Policies of Basic Science Boards*

Credentials Accepted

Alaska
Physicians are accepted on reciprocity from those states with which the board of medical examiners has established reciprocal agreements.

Arizona
Any basic science certificate that has been obtained by an examination before the issuing board and provided that at least four subjects were passed at one sitting. Practitioners licensed in a state requiring a basic science certificate prior to the passage of basic science legislation are eligible on a previous licensure basis.

Arkansas
Reciprocity on the basis of written examination with all states having basic science boards except Florida and Iowa, with the National Board of Medical Examiners, and with state medical boards each application considered individually.

Colorado
(a) There is reciprocity with the following basic science boards: Arizona, Arkansas, Michigan, Minnesota, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, and Texas.
(b) Applicants who present basic science certificates from the Connecticut and Wisconsin boards are examined in chemistry and bacteriology.
(c) Complete reciprocity with the Alaska and Iowa basic science boards is granted to those candidates whose original application was received on or before June 1, 1949. Those making application after this date must pass four of the five examinations given by the Colorado board.

Connecticut
No reciprocity.

District of Columbia
Board may exempt an applicant. All requests are considered individually.

Florida
No reciprocity.

Iowa
Credentials from any examining body accepted whose examinations are judged to be equally comprehensive and exhaustive as those given by the Iowa board.

Michigan
Certificates presented must meet legal requirements. At present Rhode Island is the only basic science board meeting the requirements.

Minnesota
(a) Reciprocity on an automatic basis with the basic science boards of Arkansas, Colorado, Nebraska, Oregon, and Tennessee (after Feb. 9, 1945) and the National Board of Medical Examiners.
(b) Reciprocity on an individual basis with basic science boards of Alaska, Arizona, Michigan, Nevada, New Mexico, Oklahoma, South Dakota, and Texas.
(c) Reciprocity on an individual basis with the medical licensing boards of Indiana, Kentucky, New York (subsequent to 1925), Oklahoma, Texas, Vermont, and Virginia.
(d) Partial credit granted for grades in certain subjects passed in examinations of medical licensing boards of Alabama, Georgia, Louisiana, New York (subsequent to 1925), North Carolina, and the District of Columbia, and the basic science board of Wisconsin.

Nebraska
No reciprocal agreements exist. Waiver may be granted at the discretion of the board.

Nevada
Reciprocity with basic science boards of Arizona, Colorado, Iowa, Minnesota, New Mexico, Oklahoma, Oregon, South Dakota, Tennessee, and Texas. Waiver with basic science boards of Arkansas, Florida, Michigan, Nebraska, and Washington.

New Mexico
Reciprocity with basic science boards of Arizona, Arkansas, Colorado, Iowa, Michigan, Minnesota, Nevada, Oklahoma, Oregon, Tennessee, and Wisconsin.

Oklahoma
Applicants are considered on an individual basis.

Oregon
Reciprocity on the basis of written examination with Arkansas, Colorado, Iowa, Minnesota, Nevada, New Mexico, Oklahoma, South Dakota, Tennessee, Texas, and Wisconsin.

Rhode Island
Endorsement with Massachusetts Board of Registration in Medicine and basic science boards of Colorado and Oklahoma.

South Dakota
Reciprocity with basic science boards of Arizona, Arkansas, Colorado, Iowa, Minnesota, Nebraska, Nevada, Oklahoma, Oregon, Tennessee, Texas, and Wisconsin.

Tennessee
Reciprocity with basic science boards of Arizona, Arkansas, Colorado, District of Columbia, Michigan, Minnesota, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, South Dakota, Texas, and Wisconsin.

Texas
Reciprocity with basic science boards of Alaska, Arizona, Arkansas, Colorado, Iowa, Michigan, Minnesota, Nebraska, Nevada, Oklahoma, Oregon, South Dakota, and Tennessee. Partial reciprocity with Wisconsin.

TABLE 35.—*Reciprocity, Endorsement, Waiver, or Exemption Policies of Basic Science Boards (Continued)*

Credentials Accepted (Cont'd)

Washington

By recent amendment, effective June 8, 1955, examination may be waived if the applicant has passed an examination before examiners in the basic sciences in those states that have a basic science act, or before examiners authorized to issue licenses to practice the healing art in another state. In case the applicant comes from a state that does not examine in all subjects required in Washington, waiver may be granted for those subjects in which the candidate has been examined if all other requirements are equal. In such a case the applicant will be examined in only those subjects needed to fulfill the requirements for the issuance of a basic science certificate.

Wisconsin

Waiver or reciprocity to commissioned officers of the armed forces, to an applicant presenting a certificate received by examination from a basic science board, to an applicant who has passed part 1 of the examination of the National Board of Medical Examiners, to a physician licensed to practice medicine in states that do not have a basic science law provided he has practiced for at least one year since the license was granted, to a physician licensed in Canada, and to foreign-trained physicians holding an M.D. degree from an acceptable school who are licensed to practice medicine in the country in which the school they attended is located.

ence boards during 1954 are shown in tables 36 and 37. The laws do not specify that a candidate reveal his school of practice. The basic science boards were developed for the purpose of insuring insofar as possible that all individuals who enter into the area of the healing arts have what is generally considered to be an adequate preparatory background. Table 36 records the total number of

TABLE 36.—*Applicants Examined in Basic Sciences, 1954*

	Examined	Passed	Failed	Percentage Failed
Alaska	2	2	*	....
Arizona	63	63	*	....
Arkansas	241	190	51	21.2
Colorado	202	202	*	....
Connecticut	197	182	15	7.6
District of Columbia	12	12	*	....
Florida	936	768	168	17.9
Iowa	220	220	*	....
Michigan	719	542	177	24.6
Minnesota	307	279	28	9.1
Nebraska	144	110	34	23.6
Nevada	34	28	6	17.6
New Mexico	80	80	*	....
Oklahoma	114	97	17	14.9
Oregon	185	74	111	60.0
Rhode Island	119	94	25	21.0
South Dakota	207	125	82	39.6
Tennessee	204	175	29	14.2
Texas	172	172	*	....
Washington	264	199	65	24.6
Wisconsin	393	327	66	16.7
Totals	4,815	3,941	874	18.2

* Failure data not reported.

candidates reported by the several boards as having been examined and the number who passed and failed. No attempt has been made to differentiate the schools of the healing arts represented by the candidates examined or certified. Seven states either had no failures or did not report figures for failures. The percentage of candidates failing is given for those states that did submit these data.

The 21 boards in operation in 1954 examined 4,815 candidates and granted certificates of proficiency in the basic sciences by written examination to 3,941 individuals. In addition, as noted in table 37, there were 1,976 certificates issued by reciprocity, endorsement, exemption, or waiver in 17 states. The number of applicants registered with or without examination in 1954 was 5,917. Of these, Texas issued 784, Florida 768, Michigan 671, and Wisconsin 519. Other states certified fewer than 500.

TABLE 37.—*Basic Science Certificates Issued by Examination, Reciprocity, Endorsement, Exemption, or Waiver, 1954*

	Certified by		
	Examination	Reciprocity, Endorsement, Exemption, or Waiver	Total Certified
Alaska	2	19	21
Arizona	63	111	174
Arkansas	190	35	225
Colorado	202	96	298
Connecticut	182	...	182
District of Columbia	12	138	150
Florida	768	...	768
Iowa	220	156	376
Michigan	542	129	671
Minnesota	279	163	442
Nebraska	110	53	163
Nevada	28	26	54
New Mexico	80	33	113
Oklahoma	97	...	97
Oregon	74	114	118
Rhode Island	94	4	98
South Dakota	125	16	141
Tennessee	175	79	254
Texas	172	612	784
Washington	199	...	199
Wisconsin	327	192	519
Totals	3,941	1,976	5,917

TABLE 38.—*Candidates for Basic Science Certification, 1927-1954*

	No. of Boards	Examination			Reciprocity, Endorsement, Exemption, or Waiver	Total Certified
		Passed	Failed	Percentage Failed		
1927	5	294	33	10.0	27	321
1928	5	617	88	12.4	19	636
1929	7	641	93	12.6	75	716
1930	7	636	127	16.6	122	758
1931	7	634	153	19.4	141	775
1932	7	634	101	13.7	118	752
1933	8	557	104	15.7	131	688
1934	9	751	115	13.3	138	889
1935	10	794	162	16.8	114	908
1936	10	917	181	16.4	243	1,100
1937	12	1,102	242	18.0	202	1,304
1938	12	1,096	230	17.3	293	1,389
1939	14	1,110	249	18.3	1,021	2,131
1940	16	1,293	290	18.3	346	1,639
1941	17	1,751	373	17.5	353	2,104
1942	17	1,725	497	22.3	304	2,029
1943	18	2,309	410	15.1	382	2,691
1944	18	2,144	605	22.0	309	2,453
1945	18	2,339	634	21.3	584	2,923
1946	19	2,558	692	21.2	1,474	4,032
1947	19	2,633	905	25.6	960	3,593
1948	19	3,038	789	20.6	1,418	4,456
1949	20	3,656	1,515	29.5	1,480	5,136
1950	20	3,430	1,340	28.1	2,526	5,956
1951	21	3,198	735	18.7	1,939	5,137
1952	21	3,806	1,346	26.1	1,924	4,730
1953	21	3,854	1,220	24.0	1,899	5,753
1954	21	3,941	874	18.2	1,976	5,917
	Totals	51,458	13,103	20.3	21,718	73,176

TABLE 39.—*Basic Science Fees*

Alaska	$25	Nevada	$25
Arizona	20	New Mexico	50 [2]
Arkansas	20 [1]	Oklahoma	15
Colorado	25	Oregon	10
Connecticut	10	Rhode Island	10
District of Columbia	25	South Dakota	15 [1]
Florida	10	Tennessee	25 [3]
Iowa	10	Texas	15 [1]
Michigan	10	Washington	10 [1]
Minnesota	15 [1]	Wisconsin	10 [4]
Nebraska	10		

1. Reciprocity, $25.
2. Reciprocity, $75.
3. Reciprocity, $10.
4. Reciprocity, $15.

In 28 years (table 38), 73,176 certificates in the basic sciences have been issued, 51,458 by examination and 21,718 by reciprocity, endorsement, exemption, or waiver. The percentage of failures in this period was 20.3.

The fees for certification in the basic sciences in the states requiring such certification are given in table 39. Examination and endorsement meetings are held in most instances semiannually, although some boards meet quarterly. THE JOURNAL publishes semimonthly the future dates of examination and reciprocity meetings of all basic science boards.

In 1954 there were 5,917 examinations given by basic science boards; 3,941 were successful and 874 examination results were reported as unsuccessful, thereby failing to give evidence of basic preparation adequate to qualify for further consideration for licensure. Figures on how many individuals these 874 examination failures represent were not available for this report. The several basic science boards differ widely from each other in the restrictions put upon the candidate with respect to repetition of examinations that have been failed and the accumulation of credit. For example, an applicant in one state must pass at least four of the six sections at one examination session. If he does not pass at least four of them, he must then be reexamined in all six subjects when he again applies. A poorly prepared applicant may continue to reapply and be reexamined at subsequent examinations. Thus, one person could conceivably be reported as a failure on four different times during a calendar year. In the instance cited, the board reports failures only once a year instead of after each examination. In another state, which does not have such a limitation in its law, credit can be accumulated from one examination to the next. It is possible, therefore, for an applicant to be examined on six different occasions and to pass one subject on each occasion. Since credit is cumulative, the applicant is issued his certificate after his sixth examination. After considering these differences in the state laws and other factors, it has been decided to publish the material as submitted, making no attempt to analyze these figures on a comparable basis from state to state.

While the data here presented may be useful to those seeking licensure in these states, it is advisable to supplement the information given by direct communication with the basic science board. The present executive corresponding officer of each of the 21 basic science boards is as follows:

Arizona	Mr. Herbert D. Rhodes, University of Arizona, Tucson.
Arkansas	Mr. C. S. Dellinger, Zoology Department, University of Arkansas, Fayetteville.
Colorado	Dr. Esther B. Starks, 1459 Ogden St., Denver 18.
Connecticut	Mr. M. G. Reynolds, 258 Bradley St., New Haven.
District of Columbia	Dr. Daniel L. Seckinger, 1740 Massachusetts Ave., N.W.
Florida	Mr. M. W. Emmel, Box 340, Gainesville.
Iowa	Dr. Ben H. Peterson, Coe College, Cedar Rapids.
Michigan	Mrs. Anne Baker, 410 W. Michigan Ave., Lansing 15.
Minnesota	Dr. Raymond N. Bieter, 105 Millard Hall, University of Minnesota, Minneapolis.
Nebraska	Mr. Husted K. Watson, Room 1009 State Capitol Bldg., Lincoln 9.
Nevada	Dr. Donald G. Cooney, Box 9005, University Station, Reno.
New Mexico	Mrs. Marguerite Cantrell, Box 1522, Santa Fe.
Oklahoma	Dr. Clinton Gallaher, 813 Braniff Bldg., Oklahoma City.
Oregon	Dr. Charles D. Byrne, University of Oregon, Eugene.
Rhode Island	Mr. Thomas B. Casey, 366 State Office Bldg., Providence.
South Dakota	Dr. Gregg M. Evans, 310 E. 15th St., Yankton.
Tennessee	Dr. O. W. Hyman, 874 Union Ave., Memphis.
Texas	Bro. Raphael Wilson, 407 Perry-Brooks Bldg., Austin.
Washington	Mr. Edward C. Dohm, Department of Licenses, Capitol Building, Olympia.
Wisconsin	Mr. William H. Barber, 621 Ransom St., Ripon.
Alaska	Dr. C. Earl Albrecht, Box 1931, Juneau.

NATIONAL BOARD OF MEDICAL EXAMINERS

The National Board of Medical Examiners is a voluntary and unofficial examining agency, the purpose of which is to prepare and to administer qualifying examinations of such merit that legal agencies governing the practice of medicine within each state may in their discretion grant successful candidates a license without further examination.

It is the function of the individual state medical licensing boards to determine who shall practice within their borders and to maintain high standards of medical practice in accordance with their own rules and regulations. In recognition of the thoroughness and widely accepted standards of the National Board examinations, its certificate is accepted as an adequate qualification by the medical licensing authorities of the states, including the District of Columbia and the territories, with the following exceptions: Arkansas, Florida, Georgia, Indiana, Louisiana, Michigan, New Mexico, North Carolina, Pennsylvania, and Texas. Certificates issued prior to October, 1953, are recognized in Georgia and those granted before Sept. 1, 1954, are accepted in Pennsylvania.

New Jersey requires that diplomates have obtained a grade of at least 75% in each subject of the National Board's examinations; New York allows only one grade below 70%. Supplementary oral examinations are required in Hawaii, Illinois, Rhode Island, and Wyoming.

In addition to the boards of medical licensure, 21 of the states and territories have established separate examining boards in the basic sciences. The laws of nine of these boards are sufficiently broad to enable them to accept the examinations of the National Board in lieu of their own. These include the boards of Alaska, Connecticut, Iowa, Minnesota, Oklahoma, Tennessee, Texas, Wisconsin, and the District of Columbia.

The National Board admits to its examinations students in good standing in medical schools in the United States and Canada that are approved by the Council on Medical Education and Hospitals of the American Medical Association. Any graduate of a school approved at the time of graduation is eligible upon presentation of a photostatic copy of the medical degree. Although previously accepting graduates of certain foreign medical

schools, the National Board, by action taken Sept. 25, 1954, will not admit to its examinations leading to certification candidates from foreign medical schools except when requested to do so by a state board of medical examiners.

TABLE 40.—*National Board Examinations in Part 1, 1922-1954*

Date	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
February, 1954	426	343	23	60	14.9
June, 1954	2,001	1,347	518	136	9.2
September, 1954	825	596	136	93	13.5
Totals	3,252	2,286	677	289	11.2
1922	388	263	58	67	20.3
1923	507	349	77	81	18.8
1924	591	415	69	107	20.5
1925	608	400	50	158	28.3
1926	625	436	104	85	16.3
1927	702	452	159	91	16.8
1928	843	533	231	79	12.9
1929	1,096	675	331	90	11.8
1930	1,260	801	345	114	12.5
1931	1,277	755	425	97	11.4
1932	1,307	847	371	89	9.5
1933	1,234	782	316	136	14.8
1934	1,241	809	347	85	9.5
1935	1,264	785	410	69	8.1
1936	1,344	858	363	123	12.5
1937	1,435	871	415	149	14.6
1938	1,654	986	508	160	14.0
1939	1,733	1,048	460	225	17.7
1940	1,653	1,069	375	209	16.4
1941	1,640	1,087	346	207	16.0
1942	1,867	1,204	471	192	13.8
1943	2,656	1,441	962	253	14.9
1944	4,229	2,326	1,465	438	15.9
1945	3,865	2,106	1,475	284	11.8
1946	3,148	1,695	1,189	264	13.5
1947	3,514	1,844	1,352	318	14.7
1948	3,807	2,178	1,262	367	14.4
1949	3,823	2,337	1,243	243	9.4
1950	3,678	2,358	986	334	9.0
1951	3,520	2,153	1,038	329	9.3
1952	3,989	2,467	1,147	375	9.4
1953	4,278	2,866	980	432	13.0
1954	3,252	2,286	677	289	11.2
Totals	68,028	41,482	20,007	6,539	13.6

The board's first examination was given in October, 1916. From that date up to and including a test given in June, 1921, 11 examinations were given and 268 candidates were certified. Since 1922 the examination has been given in three separate parts, which must be taken and completed in the following sequence: part 1, a written examination in six basic science subjects; part 2, a written examination in five major clinical divisions and their component subjects or subdivisions; and part 3, a clinical and practical examination of the candidates' ability in critical observation, in diagnostic acumen and in the principles of therapy. The examination is divided into four periods allocated to the following four major elements of general practice: clinical medicine, clinical surgery, pediatrics, and obstetrics and gynecology.

The written examinations of parts 1 and 2 are of the objective, multiple-choice type. Each examination is developed by a separate committee appointed by the Board composed of teachers and clinicians in their own fields. These committees have wide geographic distribution and are responsible for the scope and content of each examination. The examinations are broad in scope and reflect medical school teaching throughout the country. The work of the examiners shifts from grading to preparation of the many questions included in the tests. Since the examiners are agreed that each question has only one right answer, the examinations are scored by electric scoring machines. The scoring procedure is administered for the Board by the Educational Testing Service of Princeton, N. J.

The part 3 examination, as recently revised, includes essay and oral testing. In each of the four major elements of general practice, time is provided for the candidate to study a patient or clinical specimens, to write an essay test, and then to discuss his written paper and other aspects of the situation with separate examiners chosen for each subject.

Examinations in parts 1 and 2 are held in February and June at medical schools in the United States and Canada. An additional examination in part 2 is held in April, and an additional examination in part 1 in September. The examinations in part 3 are given under the direction of local subsidiary boards in 37 centers in June of each year and at other times in certain centers announced well in advance of the date of the examination. The dates for part 3 are set by the subsidiary boards early in the year and circularized to eligible candidates. The

TABLE 41.—*National Board Examinations in Part 2, 1922-1954*

Date	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
February, 1954	238	228	1	9	3.8
April, 1954	1,565	1,517	13	35	2.3
June, 1954	455	424	12	19	4.3
Totals	2,258	2,169	26	63	2.8
1922	109	90	..	19	17.4
1923	192	170	2	20	10.5
1924	267	227	..	40	15.0
1925	342	309	..	33	9.6
1926	381	334	1	46	12.1
1927	361	314	1	46	12.8
1928	410	371	1	38	9.3
1929	465	399	19	47	10.5
1930	620	543	7	70	11.4
1931	719	630	2	87	12.1
1932	732	674	..	58	7.9
1933	714	651	..	63	8.8
1934	633	583	..	50	7.9
1935	689	620	..	69	10.0
1936	768	716	2	50	6.5
1937	855	803	1	51	6.0
1938	861	815	..	46	5.3
1939	938	884	..	54	5.8
1940	1,028	963	9	56	5.5
1941	1,001	954	1	46	4.6
1942	1,072	1,031	..	41	3.8
1943	1,861	1,805	..	56	3.0
1944	1,405	1,350	..	55	3.9
1945	1,599	1,565	..	34	2.1
1946	1,825	1,782	..	43	2.4
1947	1,641	1,613	..	28	1.7
1948	1,742	1,725	..	17	0.9
1949	1,737	1,691	..	46	2.6
1950	1,863	1,837	..	26	1.3
1951	2,045	2,017	..	28	1.4
1952	2,017	2,001	..	16	0.8
1953	2,200	2,145	1	54	2.4
1954	2,258	2,169	26	63	2.8
Totals	35,350	33,781	73	1,496	4.2

dates of all examinations are posted on college bulletin boards and published in THE JOURNAL and in "The National Board Examiner," the official publication of the National Board of Medical Examiners.

The tables that are presented refer to the results of examinations in all three parts since 1922, including the number who passed and failed examinations and the number certified.

A candidate is eligible for part 1 who has successfully completed the first two years of work in an approved medical school. Candidates are required to take all six subjects of part 1 at one examination period unless entitled to take an incomplete examination. An incomplete examination is allowed candidates taking part 1 at the end of their second year in a medical school where the third year curriculum includes courses in one or two subjects of this part. The examinations in the subjects not yet complete are therefore postponed and may be taken at any examination period after the candidate has completed them in his medical school. The numbers of such candidates are recorded in the tabulations presented under the heading "Incomplete Examinations" and are excluded from the calculations referring to the percentage of failures.

TABLE 42.—*National Board Examinations in Part 3, 1922-1954*

Year	Total Examinations	Passed	Failed	Percentage Failed
1922	22	22	..	0.0
1923	82	81	1	1.2
1924	126	120	6	4.8
1925	219	206	13	5.9
1926	255	243	12	4.7
1927	293	272	21	7.2
1928	322	306	16	5.0
1929	352	337	15	4.3
1930	420	401	19	4.5
1931	437	419	18	4.1
1932	550	522	28	5.1
1933	551	526	25	4.5
1934	567	548	19	3.4
1935	598	578	20	3.3
1936	576	547	29	5.0
1937	668	630	38	5.7
1938	706	682	24	3.4
1939	770	729	41	5.3
1940	792	771	21	2.7
1941	910	885	25	2.7
1942	1,054	1,041	13	1.2
1943	1,230	1,213	17	1.4
1944	1,168	1,146	22	1.8
1945	1,245	1,232	13	1.0
1946	1,634	1,613	21	1.2
1947	1,741	1,723	18	1.0
1948	1,715	1,700	15	0.9
1949	1,685	1,674	11	0.6
1950	1,752	1,736	16	0.9
1951	1,738	1,708	30	1.7
1952	2,128	2,036	92	4.3
1953	2,089	1,979	60	2.9
1954	2,121	2,052	69	3.1
Totals	30,466	29,678	788	2.6

Eligibility for part 2 calls for successful completion of a four-year medical course in an approved medical school. Incomplete examinations may also be taken in this part under circumstances similar to those described for part 1. A candidate is eligible for part 3 if he has passed parts 1 and 2, received the degree of doctor of medicine, and has served at least one year in an approved hospital internship.

Tables 40 and 41 record the results of examinations given in parts 1 and 2 during 1954 and for each year since 1922. The data shown in these tables represent examinations conducted rather than persons examined, and the figures thus include candidates who fail and are reexamined during the same year and those who pass parts 1 and 2 in the same year.

There were 3,252 examinations in part 1 given in 1954, 2,286 passed, and 289, or 11.2%, failed. Incomplete examinations numbered 677. In part 2, 2,258 examinations were held, 2,169 passed, and 63, or 2.8%, failed. Twenty-six incomplete examinations were given.

From 1922 to 1954, inclusive, a total of 68,028 examinations have been given in part 1 and 35,350 in part 2. The successful examinations totalled 41,482 in part 1 and 33,781 in part 2. In this 33 year period, there

TABLE 43.—*Diplomates from Individual Medical Schools, 1954*

United States		University of Tennessee	2
Medical College of Alabama	2	Meharry Medical College	5
College of Medical Evangelists	26	University of Texas	1
Univ. of Southern California	4	Baylor University	1
Stanford University	7	University of Utah	1
Yale University	60	University of Vermont	24
Georgetown University	95	University of Virginia	2
George Washington University	83	Medical College of Virginia	5
Howard University	17	University of Washington	1
Emory University	4	University of Wisconsin	1
Medical College of Georgia	1	Marquette University	19
Chicago Medical School	67		
Northwestern University	49	**Canada**	
Stritch School of Medicine	8	University of Alberta	1
University of Chicago	20	University of Manitoba	1
University of Illinois	16	University of Ottawa	1
State University of Iowa	11	University of Western Ontario	4
University of Kansas	2	University of Toronto	10
University of Louisville	2	McGill University	20
Tulane University	2		
Johns Hopkins University	8	**Foreign**	
University of Maryland	2	Univ. of Adelaide, Australia	1
Boston University	65	University of Vienna, Austria	1
Harvard Medical School	125	Hsiang Ya Med. College, China	2
Tufts College Medical School	102	Peiping Union Medical College, China	1
University of Michigan	1	St. John's University, China	8
University of Minnesota	16	West China Union University	1
St. Louis University	6	Woman's Christian Medical College, China	1
Washington University	8	University of Havana, Cuba	1
Creighton University	3	Univ. of Copenhagen, Denmark	1
University of Nebraska	5	Univ. of Cambridge, England	1
Albany Medical College	50	University of Leeds, England	1
State Univ. of N. Y., Brooklyn	143	Licentiate of the Royal College of Physicians of London and Member of the Royal College of Surgeons of England	3
University of Buffalo	60	Univ. of Tubingen, Germany	1
Columbia University	106	Royal Iraq Medical College	1
Cornell University	84	American University of Beirut, Lebanon	1
New York Medical College	114	University of Wilno, Poland	1
New York University	113	Univ. of Glasgow, Scotland	1
University of Rochester	47	Licentiate of the Royal College of Physicians and Surgeons of Edinburgh and Glasgow, Scotland	2
State Univ. of N. Y., Syracuse	57	Univ. of Geneva, Switzerland	2
Duke University	31	Univ. of Lausanne, Switzerland	4
University of Cincinnati	3	Univ. of Zurich, Switzerland	3
Western Reserve University	1		
Ohio State University	13		
University of Oklahoma	1		
University of Oregon	4		
Hahnemann Medical College	80		
Jefferson Medical College	26		
Temple University	105		
University of Pennsylvania	27		
Woman's Medical College	29		
University of Pittsburgh	4		

have been 6,539 failures in part 1 (13.6%) and 1,496 (4.2%) in part 2.

In 1954, 2,121 tests were given in part 3; 2,052 passed, and 69 (3.1%) failed. Results of examinations in part 3 in 1954 and in the 32 preceding years are given in table 42. In 33 years, 30,466 were tested, of whom 29,678 were granted the certificate of the board. The percentage of failures in the board's final examination for the 33 year period was 2.6.

The 2,052 physicians certified as diplomates in 1954 represented 62 medical schools in the United States, 6 in Canada and 21 medical schools of other countries. The school and the number of examinees from each are included in table 43.

The tabular data thus far presented represent examinations given. The number of persons tested during any one year is recorded for the 33 year period in table 44. The classification "Passed" or "Failed" in cases in which more than one examination has been taken in a given year are based on the results of the last examination during the year in question. For example, if in 1954 a candidate passed part 1 but at a subsequent examination during the year failed part 2, he is computed in this table as having failed. On this basis, figures computed indicate that there were 7,060 persons who took at least one test of the National Board in 1954. In all, 120,007 persons were examined in one or more of the annual examinations, 97,659 passed, 14,992 took incomplete examinations, and 7,356 (7%) failed.

TABLE 44.—*Parts 1, 2, and 3, Excluding Duplications, 1922-1954*

Year	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
1922	525	381	58	86	16.4
1923	775	594	79	102	14.7
1924	978	756	69	153	16.8
1925	1,167	915	50	202	18.1
1926	1,161	930	105	126	11.9
1927	1,248	947	142	159	14.4
1928	1,430	1,101	211	118	9.7
1929	1,723	1,280	319	124	8.8
1930	2,044	1,547	322	175	10.2
1931	2,218	1,632	410	176	9.7
1932	2,342	1,850	355	137	6.9
1933	2,277	1,806	280	191	9.6
1934	2,261	1,801	330	130	6.7
1935	2,368	1,831	408	129	6.6
1936	2,517	1,989	353	175	8.1
1937	2,735	2,151	397	187	8.0
1938	2,992	2,308	493	191	7.6
1939	3,221	2,476	443	302	10.9
1940	3,188	2,597	363	228	8.1
1941	3,318	2,749	332	237	7.9
1942	3,607	3,014	391	202	6.3
1943	4,514	3,671	606	237	6.1
1944	5,363	4,235	759	369	8.0
1945	5,614	4,468	886	260	5.5
1946	5,912	4,730	898	284	5.7
1947	6,249	4,965	1,002	282	5.3
1948	6,389	5,194	902	293	5.3
1949	6,493	5,376	880	237	4.2
1950	6,596	5,630	665	301	4.5
1951	6,602	5,601	699	302	4.5
1952	7,334	6,204	729	401	5.5
1953	7,786	6,708	584	494	6.8
1954	7,060	6,222	472	366	5.5
Totals	120,007	97,659	14,992	7,356	7.0

In 1954, there were 3,410 licenses to practice medicine issued by endorsement of the certificate of the National Board of Medical Examiners in 41 states, the District of Columbia, and the territories and outlying possessions. The number registered by each of these licensing boards is recorded in table 45. There have been 29,397 licenses issued on the basis of endorsement of the board's certificate since 1915.

TABLE 45.—*Licenses Granted on the Basis of National Board Certificates, 1954*

Alabama	24	New Jersey	102
Arizona	12	New York	954
California	434	North Carolina	4
Colorado	28	North Dakota	6
Connecticut	173	Ohio	95
Delaware	3	Oklahoma	8
District of Columbia	76	Oregon	18
Georgia	17	Pennsylvania	300
Idaho	2	Rhode Island	17
Illinois	87	South Carolina	13
Iowa	28	South Dakota	4
Kansas	19	Tennessee	24
Kentucky	25	Utah	14
Maine	33	Vermont	27
Maryland	102	Virginia	55
Massachusetts	322	Washington	39
Michigan	69	West Virginia	9
Minnesota	65	Wisconsin	20
Mississippi	4	Wyoming	4
Missouri	38	Alaska	5
Montana	10	Hawaii	10
Nevada	5	Puerto Rico	24
New Hampshire	22		
		Totals	3,410

A number of medical schools use the National Board's examinations for their students, thus providing an additional objective evaluation of a student's progress and the effectiveness of their teaching. However, the National Board is opposed to any attempt on the part of a medical school to shape its curriculum with the primary purpose of preparing students for these examinations.

The membership of the National Board includes representation from the Council on Medical Education and Hospitals of the American Medical Association, the Association of American Medical Colleges, the Federation of State Medical Boards of the United States, the armed services, and the Veterans Administration. Members at large are elected from among leaders in medicine throughout the country. The National Board membership has recently been expanded to include the chairmen of the test committees. This expanded committee will concern itself with the control and integration of the content of all examinations of the board. It will also be responsible for continuing search and study of methods to improve the quality and validity of the examinations.

The officers of the board are: Robert A. Moore, M.D., President; Herman G. Weiskotten, M.D., Vice President; John P. Hubbard, M.D., Executive Secretary and Treasurer; J. Stewart Rodman, M.D., Honorary Medical Secretary; Ralph Jones Jr., M.D., Assistant Secretary; Christian J. Lambertsen, M.D., Assistant Secretary; Miss Geneva Leach, Assistant Secretary and Treasurer; Everett S. Elwood, Consultant on State Board Relations.

The address of the board is 133 S. 36th St., Philadelphia 4.

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STATUS REPORT ON POLIOMYELITIS VACCINE BY A. M. A. BOARD OF TRUSTEES

Many months ago we informally asked a member of the Medical Advisory Committee to the National Foundation for Infantile Paralysis if the foundation would like to have the Association appoint a committee to make an evaluation of the utilization of the Salk vaccine, in addition to any evaluation the foundation might make. The Association was told that this was not necessary.

On January 10, 1955, the National Foundation called a conference of representatives of several organizations, including the A. M. A. This conference was to consider nationwide administrative policies for the 1955 poliomyelitis vaccine program and dealt primarily with children in the first and second grades and in the 1954 field trial groups who did not receive the vaccine.

Although scientific articles appeared in THE JOURNAL relative to the vaccine, nothing more was heard until February 14, 1955, when the Association was approached with a proposal that it co-sponsor a closed-circuit television program on the Salk vaccine at some future date. We then inquired from the National Foundation as to when this program would be produced, but the date was not firm; it was thought to be in early April. We suggested that before the results of the trials conducted in the spring of 1954 were announced the Association be authorized to examine them and sit in with the representatives of the foundation who were evaluating them, in order that the Association might have first-hand knowledge of what type of television program it was co-sponsoring. This was agreed to, and representatives were appointed.

Under date of March 23 the Association was informed that there would be no preview of the material to be presented on April 12, 1955. We notified the A. M. A. representatives, who had already been appointed, of this fact and withdrew any co-sponsorship of the television program, as we had no knowledge at that time of what the results of the evaluation or the data providing the basis of the announcement would be.

Invitations were issued to representatives of the Association to attend the announcement in Ann Arbor on April 12, and Drs. Elmer Hess, D. H. Murray, E. B. Howard, and Austin Smith were present. Since then we have had no communications from the National Foundation. The Francis report presented on this date was the first information that we had relative to the results of the field trials.

In view of the rapid developments within the past few days with respect to the promulgation of minimum standards for the licensing of manufacturers producing the Salk antipoliomyelitis vaccine, and the extent of production under these circumstances, we are unable to furnish any detailed factual information to the profession at this time. As soon as additional information becomes available, it will be published in THE JOURNAL.

MEDICAL LICENSURE

The 53rd annual report on medical licensure prepared by the Council on Medical Education and Hospitals appears in this issue of THE JOURNAL. Data are presented in the first section concerning the medical examination and the licensure of physicians in the United States and its territories and outlying possessions for 1954. In addition, the report summarizes trends in licensure over many years. Current regulations pertaining to medical licensure are also presented. The boards of examiners in the basic sciences are discussed in the second section of the report and, lastly, the National Board of Medical Examiners.

In 1954, a total of 15,029 licenses to practice medicine and surgery were issued by the 54 boards authorized by law to grant licenses to practice the art and science of medicine. The 15,029 licenses issued last year represented 6,827 granted after a successful written examination and 8,202 granted by reciprocity and endorsement of state licenses or the certificate of the National Board of Medical Examiners. The number of licenses issued annually has been steadily increasing. The increase last year as compared with 1953 totaled 595; 262 were by written examination, and 333 were by endorsement of credentials.

Licentiates of 1954 who received their first license to practice medicine and surgery during the calendar year and who represent additions to the medical profession numbered 7,917. In 1954, there were 3,667 deaths of physicians reported to the offices of the American Medical Association. Thus the physician population in the United States and its territories and outlying possessions was increased by 4,250. The physician population increase in 1954 exceeded that of 1953 by 641. Increases occurred in 31 states. Last year 1,033 examination failures were reported. Failures by graduates of approved medical schools in the United States amounted to 4.2% and by graduates of medical schools in Canada, 4.8%. The percentage of failures in three other groups—graduates of foreign faculties of medicine, unapproved medical schools, and schools of osteopathy—were 42.6%, 64.4%, and 16.6% respectively.

Provision is made by 33 boards for the issuance of temporary and educational permits, limited and temporary licenses, or other certificates of limited registration. The terms for the issuance of these certificates vary and may apply to hospital training, to those ineligible for licensure who seek further educational training, for practice in emergency areas, or for regular practice until the next regular session of the licensing board when permanent licensure is granted.

The preprofessional and professional educational requirements of each licensing board are included in the study and also the states requiring an internship for licensure, regulations pertaining to the registration or required licensure for those serving in hospitals as interns or residents, the schedule of written examination dates and reciprocity meetings, medical license fees, licensure on government credentials, and annual registration requirements.

The study reveals that graduates of foreign medical schools were examined for medical licensure by 38 boards in 1954. Graduates of 183 medical schools and 3 licensing corporations were examined, representing medical schools in the Philippines, Iceland, 14 South and Central American countries, 26 countries in Europe, and 13 in Asia. At its meeting in June 1954, the House of Delegates of the American Medical Association requested the Council on Medical Education and Hospitals to study the problem of the foreign-trained physician seeking educational and licensure privileges in the United States. The Council has been actively engaged in this study, and there has been formed a Cooperating Committee on Graduates of Foreign Medical Schools, including, in addition to Council representatives, representatives from the Federation of State Medical Boards of the United States, the Association of American Medical Colleges, and the American Hospital Association.

The report pertaining to the results of examinations given by the 21 boards of examiners in the basic sciences reveals that certificates were issued to 5,917 candidates in 1954. Of these, 3,941 were granted after written examination and 1,976 by reciprocity, endorsement, exemption, or waiver. The failure percentage for those reporting this information was 18.2. The basic science laws do not specify that a candidate reveal his school of practice. No attempt has been made in this study to differentiate between the schools of the healing arts represented by the candidates examined or certified.

The last series of tabulations refers to the examinations given by the National Board of Medical Examiners. The certificate of the National Board is recognized by the medical licensing authorities of the states, including the District of Columbia and the territories, with the exception of Arkansas, Florida, Georgia, Indiana, Louisiana, Michigan, New Mexico, North Carolina, Pennsylvania, and Texas. There were 7,060 persons who took at least one of the tests of the National Board in 1954, and 2,052 were certified as diplomates. In 1954 there were 3,410 licenses to practice medicine issued by endorsement of the National Board's certificate by 44 boards.

This report is made available through the cooperation of the various examining and licensing boards; for their cooperation the Council and THE JOURNAL wish to express appreciation.

PROPERDIN AND NATURAL IMMUNITY

In its fight against disease, the body has two types of immunity. The first is the specific systems of resistance the body builds after being exposed to a disease, the second, the innate or natural immunity of the body, which is not dependent on a prior exposure to an infective agent. Some of the nonspecific methods used by the body to combat disease include the phagocytic activity of the white blood cells and the presence of the enzyme lysozyme in many tissues and secretions, both of which dispose of some bacterial invaders.

Recently, Pillemer and associates [1] isolated a protein from the blood that may have an important role in natural immunity. The protein is a euglobin with a molecular weight about eight times that of the gamma globulins, and it has been named properdin. On assaying the serum of various species for properdin it was found that the rat had the highest level, 25 to 35 units per milliliter, and the guinea pig had the lowest, 1 to 2 units per milliliter. This is also the relationship of the two species to infection; the rat, which has the highest properdin level, is notoriously resistant to bacterial infections, and the guinea pig is quite susceptible. The cow and the hog, which are usually more resistant than sheep, have higher serum levels of properdin. Man has properdin levels in an intermediate range (4 to 8 units per milliliter) but below that of the cow and hog.

Most human serums were found to have a high bactericidal activity toward Shigella dysenteriae, when tested according to the system used by these investigators, but if properdin were removed from the serum the resulting treated serum was nonbactericidal. Also, properdin alone does not inhibit the bacterial activity. These observations were interpreted as indicating that properdin acting in conjunction with other factors in normal serum was responsible for the bactericidal activity. The components of complement that were present in normal serum are believed to be the necessary factors that render properdin active against S. dysenteriae.

Rats, which are normally resistant to infections, develop severe bacteremia, of enteric origin, after total body irradiation. These investigators found that rats that received a total body radiation of 500 r had control properdin serum levels of 25 to 35 units, that on the second postirradiation day the level had fallen to 4 to 6 units, and that by the seventh postirradiation day there was less than 1 unit per milliliter. The same low level was noted on the 13th day after irradiation. The fall in the properdin level between the second and seventh day and the onset of the severe bacteremia that was responsible for the death of the animals were believed to have a cause and effect relationship. Apparently the radiation destroys the properdin or the properdin-forming system and this allows for the spread of infection. In addition, these investigators report that, by giving rats 250 units of cow properdin on the second, fourth, and seventh days following an irradiation of 660 r, partial protection against the lethal effects of the radiation were noted.

Properdin has not been demonstrated to play a role in the living animal, and we cannot be sure that it plays a

1. Pillemer, L., and others: The Properdin System and Immunity: 1. Demonstration and Isolation of a New Serum Protein, Properdin, and Its Role in Immune Phenomena, Science **120**: 279, 1954.

significant role, if any, in natural immunity. However, it provides a basis for further investigation into the cause of natural immunity, since nonspecific types of resistance are important defenses against the daily assaults made upon man and animals by bacteria.

DRUG-INDUCED HEMOLYTIC ANEMIA

Blood dyscrasias are important toxic effects associated with the use of a wide variety of drugs. Despite the importance of these reactions, little is known concerning their fundamental nature. This is in part due to the fact that such changes are not readily obtainable with laboratory animals, while their serious nature usually precludes extensive investigation in human beings. Hence, discussions of these dyscrasias are largely confined to clinical case reports, where, in some cases, association between a given drug and the dyscrasia is not always clear-cut.[1] The extensive study now being undertaken by Alving and his associates [2] on the hemolytic effects of the 8-aminoquinoline, primaquine, is therefore of great clinical and experimental interest.

Primaquine, developed during the close of World War II, is the most effective curative antimalarial agent presently available. However, in sensitive persons, it gives rise to an acute, self-limited hemolytic anemia. Alving and his associates, with the help of volunteers from among the inmates of the Statesville Penitentiary, showed that this sensitivity occurs almost exclusively in heavily pigmented races, some 10% of American Negroes being susceptible. They further showed, by a series of cross transfusion experiments with radiochromium-tagged red blood cells, that the susceptibility lay in the erythrocytes themselves. Thus, tagged erythrocytes from susceptibile persons, when injected into nonsusceptible persons, underwent hemolysis rapidly when the recipient was given primaquine. On the other hand, tagged erythrocytes from normal persons did not hemolyze when injected into susceptible recipients receiving primaquine, despite the fact that the recipients' own cells were rapidly lyzed. Again, with the use of radiochromium-labeled cells, these investigations revealed that the self-limiting nature of the hemolytic crisis was not due to tolerance to the drug but to the fact that the older red blood cells are sensitive to the hemolytic action of primaquine. Once these older cells are removed from the circulation, no further hemolysis occurs. No significant differences could be detected between red blood cells from susceptible and nonsusceptible persons as regards immunologic characteristics, fragility, hemoglobin type, and methemoglobin content. The only demonstrable morphological difference was the appearance of Heinz bodies in erythrocytes of sensitive persons just prior to drug-induced hemolysis. Since these disappeared as hemolysis progressed, it was felt that they represent a manifestation of some injury inflicted by the drug that results in the selective destruction of the cells.

In an extension of these studies, it was shown that primaquine-sensitive erythrocytes are highly susceptible to hemolysis by certain other drugs, including sulfanilamide, acetanilid, phenylhydrazine, sulfoxone, and acetophenetidin. The characteristics of the anemia following these drugs was identical with that following primaquine, and primaquine failed to cause further hemolysis when administered shortly after the hemolytic anemia occasioned by these drugs. Thiazolsulfone (Promizole) frequently but not invariably caused hemolysis in primaquine-sensitive persons. Furthermore, tagged red blood cells from primaquine-sensitive donors were not hemolyzed in one nonsensitive recipient given thiazolsulfone but were in another. The latter person showed signs of toxic effects, including methemoglobinemia, abdominal pain, nausea, headache, and slight anemia. This suggests that the degree of drug-induced hemolysis in sensitive persons may be modified by such extracorpuscular factors as individual differences in absorption, excretion, or metabolism of the drug.

In a current communication, the Chicago group reports that primaquine-sensitive erythrocytes form Heinz bodies in vitro more readily than nonsensitive cells, and they describe an in vitro test for predicting sensitivity to primaquine and certain other drugs. The test consists of incubating blood with acetylphenylhydrazine solution and then examining the red blood cells for the presence of Heinz bodies. In 18 known sensitive persons the mean percentage of erythrocytes containing 5 or more Heinz bodies was 67.8, with a range of 45 to 92, while the corresponding value in 86 nonsensitive persons was 11.9, with a range of zero to 28 in all but of the two cases, in which values of 46 and 62 were given. In these two persons with false positive results there were consistently higher results on repeated tests than those obtained from other nonsensitive persons, and their anomalous behavior could not be satisfactorily explained. Erythrocytes from patients with various abnormal hemolytic states such as polycythemia vera, sickle cell trait, hereditary leptocytosis, and paroxysmal nocturnal hemoglobinemia behaved like those from nonsensitive persons in this test.

The investigators consider that there must be a close association between Heinz-body formation and the mechanism of hemolysis. Since Heinz-body formation always varied directly with the degree of oxygenation, they suggest that possibly sensitive cells lack an enzyme system that normally protects the hemoglobin from oxidative changes leading to Heinz-body formation. Preliminary results have indicated that a deficiency of red blood cell sulfhydryl compounds is closely associated with sensitivity to hemolysis.

From these studies it appears that the key to one type of drug-induced blood dyscrasia may soon be provided, and it is to be hoped that in the near future the related and more serious problems of drug-induced aplastic anemia and granulocytopenia will likewise yield their secrets.

1. Welch, H.; Lewis, C. N., and Kerlan, I.: Blood Dyscrasias: A Nation-Wide Survey, Antibiotics & Chemother. **4**: 607, 1954.

2. Dern, R. J. and others: The Hemolytic Effect of Primaquine: 1. The Localization of the Drug-Induced Hemolytic Defect in Primaquine-Sensitive Individuals, J. Lab. & Clin. Med. **43**: 303, 1954. Dern, R. J.; Beutler, E., and Alving, A. S.: The Hemolytic Effect of Primaquine: 2. The Natural Course of the Hemolytic Anemia and the Mechanism of Its Self-Limited Character, ibid. **44**: 171, 1954. Beutler, E., Dern, R. J., and Alving, A. S.: The Hemolytic Effect of Primaquine: 3. A Study of Primaquine-Sensitive Erythrocytes, ibid. **44**: 177, 1954; 4. The Relationship of Cell Age to Hemolysis, ibid. **44**: 439, 1954. Dern, R. J.; Beutler, E., and Alving, A. S.: The Hemolytic Effect of Primaquine: 5. Primaquine Sensitivity as a Manifestation of a Multiple Drug Sensitivity, ibid. **45**: 30, 1955. Beutler, E.; Dern, R. J., and Alving, A. S.: The Hemolytic Effect of Primaquine: 6. An in Vitro Test for Sensitivity of Erythrocytes to Primaquine, ibid. **45**: 40, 1955.

THE PRESIDENT'S PAGE

A MONTHLY MESSAGE

At the time this is written, committee hearings in the House of Representatives are being held on important legislative matters of particular interest to physicians. These hearings pertain to further extension of the special draft of physicians, proposals for the "equalization" of pay for physicians in the service, and a bill for establishing military medical scholarships. I regret that plane transportation difficulties prevented my appearance at these hearings. The Association, however, was ably represented by Dr. R. B. Chrisman of Florida and Dr. Edward Turner of our Council on Medical Education and Hospitals. At this time, the final action of the Congress on these subjects is not known, but it is important that physicians, as well as the general public, be fully informed as to the position of the American Medical Association.

At the time of the Korean outbreak, the American Medical Association actively supported the doctors' draft. It was felt that, as an emergency existed and the medical needs of the armed forces were so urgent, such action was necessary in the public interest. It was felt that these needs could not be met through the mechanism of the regular draft. This condition no longer exists, and no convincing evidence has been developed that the medical needs of our armed services cannot be met through existing mechanisms and without resort to a special draft of physicians and dentists. The situation has been aggravated by the failure of the Defense Department to improve its recruitment of regular medical forces or to squarely face the problem of the medical care of dependents of members of the armed forces on a realistic basis. Information from the Department of Defense, reinforced by evidence drawn from experience of physicians who have served or are serving in defense medical organizations, indicates no present shortage of physicians, but an actual excess in some specialty categories. Furthermore, there has been a progressive increase in the volume of medical care of dependents rendered by the personnel and through the facilities of the armed forces.

It is realized that at this particular moment we may not be aware of the gravity of the present world situation, nor can we know what future emergencies may arise. Like all other Americans, we believe that, if such emergencies develop or seriously threaten, all other considerations must be subordinated to our defense needs. We have recommended, therefore, that stand-by legislation be enacted, with a proviso authorizing the President to activate it if and when, in his judgment, such an emergency exists.

Meanwhile, Congress should determine the extent of our country's obligation for the medical care of dependents of members of the armed forces. I believe that an obligation does exist and that the extent of this obligation varies with the length of service. When facilities exist, care can be more economically rendered in civilian facilities and thus the medical personnel of the Defense Department can be freed for a more effective discharge of their primary mission of supporting the defense functions of the armed forces. I also believe that the government's obligation to dependents can be discharged through participation in an insurance program for members of this group. At the present, only the dependents who have physical access to defense facilities can avail themselves of federal aid. A well-ordered insurance program would make this aid generally available.

A solution to this problem has an immediate bearing on the necessity for a special draft of physicians. There seem to be no rational grounds for drafting physicians and for engaging scarce nursing and medical technical personnel to support a growing medical care program in the armed forces hospitals for these dependents. An insurance program applicable to all dependents would be more equitable, since care would be equally available to all of them wherever they would be located. Civilian hospital services are designed to care for our total population. They would be better supported by the insurance approach, since their medical and technical personnel would not be depleted by further demands to meet the special medical needs of the armed forces.

The American Medical Association also supports, with some reservations, H. R. 4645. The purpose of this bill is to strengthen the medical personnel of the armed forces on a temporary or, perhaps, even on a permament basis. This would be accomplished by means of scholarship grants to certain medical students who would agree to accept in return three to four years of active duty and reserve commissions for a period of eight years. This might solve some of the existing difficulties by supplying the armed forces a more stable corps of qualified physicians. We believe that the government should have no part in the selection of students and that the scholarships should only become available after regular matriculation. A student under the plan should be subject to the same standards of scholarship and conduct as any other student. It seems wise that a limitation of the number of scholarships be followed and that in all schools and in any one class this should not exceed 5%.

The American Medical Association has long been aware of the medical problems of our defense forces. A large fraction of its present membership has seen service in time of war. Our Council on National Defense has had an active part in studying these problems and advising the several governmental agencies. We are also aware of the impact of expanding federal medical services on the further development of civilian facilities and services needed for the care of our total population. We believe that our national interest is best served by wise and proper division of our total medical resources and by the avoidance of waste and undue dispersion of these resources, as will occur if they are drawn on more heavily than is justified by a realistic appraisal of the needs of the medical services of the armed forces.

WALTER B. MARTIN, M.D.,
Norfolk, Va.

ORGANIZATION SECTION

STATEMENT OF DR. F. J. L. BLASINGAME ON S. 1323 AND PART E, S. 434 BEFORE SENATE SUBCOMMITTEE

I am Dr. F. J. L. Blasingame, of Wharton, Texas, where I am engaged in the active practice of medicine. I am a member of the Board of Trustees of the American Medical Association and am appearing here today, accompanied by Dr. Walter S. Wiggins of Chicago, Illinois, as a representative of that Association in connection with S. 1323 and Part E of S. 434, 84th Congress, currently under consideration by your Committee.

The Association supports S. 1323, with two modifications which we will suggest later in our testimony, and opposes Part E of S. 434. Before commenting on these two bills, I should like to present some background information concerning the interest of the Association in the subject of medical education.

The original call of the Medical Society of the State of New York which led to a preliminary national convention in 1846 and culminated in the organization of the American Medical Association a year later commenced with this credo: "It is believed that a national convention would be conducive to the elevation of the standard of medical education in the United States." One of the first acts at the initial association meeting was the establishment of a Committee on Education which functioned for 57 years before the formation of the present Council on Medical Education and Hospitals. Thus, for over a century the American Medical Association has been actively and effectively engaged in the improvement of medical education in the United States. Largely as a result of the vigorous efforts of the Association in conjunction with other interested organizations it can now be said with assurance today that medical education in this country is superior to that found anywhere else in the world.

As practicing physicians we are vitally interested in the quality of medical education because of its direct relationship to medical care. It is not a coincidence that the improved standards of medical care in the last half century followed the elimination of substandard medical schools and diploma mills which had been, until then, releasing their graduates in large numbers.

A striking example of the truth of this relationship is found in the experiences of military medicine during World War II and the Korean conflict. It is common knowledge that the death rate from wounds in World War II was just about one-fourth of that in World War I and that this record was markedly improved in Korea. It is frequently assumed that this great improvement was the result of the new and potent weapons in the armamentarium of science. It is believed that the sulpha drugs, penicillin, and the administration of plasma and whole blood were the causes of our low death rate. These were not the causes of the high quality of medical care provided our Armed Forces. The success of the Medical Corps was due, rather, to the proficiency of the medical officers and the superiority of their medical education. That the superior medical education received by our officers was the primary factor is evidenced by the fact that we gave certain of our allies all of the penicillin they could use; we gave them all the sulpha they needed; and we provided them with plentiful supplies of plasma and blood. Their tools were the same as those used by our physicians. Yet, in their armies the death rate was the same as ours in World War I, nearly thirty years ago. Our own medical officers had the training required to use these new weapons of medicine. Unfortunately, this was not the case in the armies of some other countries.

The high degree of excellence of our medical education has been achieved only after a very long struggle. In 1905, when the Council on Medical Education of the American Medical Association was created, it surveyed the status of medical education in this country. The scene was not one to inspire satisfaction. By comparison with England, Germany, and France, medical education in this country was decidedly inferior. Of the more than 160 medical schools in the country at that time, many accepted students without a complete high school education. There were only five schools which required two or more years of college premedical work. Throughout the country, with few exceptions, academic standards were low, facilities and faculties were insufficient, financial support was lacking, students were poorly prepared, and failures in licensing examinations were many.

The first annual report of the Council on Medical Education pointed to the existence of 54 medical schools in the states of Illinois, Missouri, Maryland, Kentucky, and Tennessee, not more than six of which could be considered acceptable. These 54 schools in the five states mentioned have now been reduced in number to 12 approved four-year institutions.

The early reports of the Council on Medical Education occasioned considerable resentment in many of the medical colleges. It occurred to some members of the Council that the publication and approval of its work by an independent organization of sufficient stature to gain widespread acceptance of its views would assist materially in bringing about an improvement in medical education. Arrangements were made for Dr. Abraham Flexner of the Carnegie Foundation for the Advancement of Teaching to cooperate with the Council in investigating the medical schools.

The Carnegie study was begun in 1908 by Dr. Flexner and Dr. N. P. Colwell, Secretary of the Council on Medical Education. Two years later their results were published in what was commonly known as the "Flexner Report." This report revolutionized medical education. As compared with the 160 schools in 1905, the number was reduced to 95 in the following 10 years, to 85 by 1920, and to 80 by 1927. These reductions came from elimination of the inadequate schools.

When the results of the Council's early surveys began to take effect and the number of medical schools decreased, considerable anxiety and even alarm were expressed in certain quarters. There was anxiety lest the decrease in the number of schools would result in far fewer physicians being graduated and consequently, an increasing dearth of physicians in the United States. Statistics in this regard reveal that in 1905 the 160 medical schools released 5,606 graduates. In 1922, the low point in numbers of graduates, the remaining 81 schools graduated 2,529 students. Had this condition persisted there would undoubtedly have been a deficiency in physicians, since considerably more than 2,500 physicians die every year. But it did not persist. In the 20 years from 1922 until 1942 the number of medical schools was still further decreased to 77, yet the number of graduates gradually increased so that in 1944 the schools graduated 5,163, about double the number graduating in 1922 and approximately the number graduating from the 160 schools in 1905. Last year 80 approved medical schools graduated 6,861 students. Estimated projections made of admissions and graduates show that from 7,300 to 7,500 physicians should be produced annually by 1960.

I should like to stress again that the physicians graduating from medical schools in the United States today not only exceed in number those graduated in 1905 but that they are infinitely superior in their medical knowledge because of the high standards of medical education which have been achieved. This improvement is due, in large part, to the persistent and frequently misunderstood efforts of the American Medical Association to elevate the standards of instruction in our medical schools. We have never believed in sacrificing quality for quantity and we do not so believe today. Nor has adherence to high standards decreased the numbers of physicians. While the population of the nation has approximately doubled since 1910, student enrollment in *approved* schools of medicine has increased from 12,530 to 28,229, or more than 125%. In 1910 there were only 3,165 physicians graduated from approved medical schools as compared to 6,861 in 1954, an increase of 115%.

We have no desire to claim more than our share of the credit for this improvement. Throughout the entire period since 1910, the Council on Medical Education and Hospitals of the American Medical Association has worked closely with the Associ-

ation of American Medical Colleges in constant efforts to assist in developing and maintaining the highest possible standards of medical education in the United States in the interests of the American public, through the medium of establishing sound basic essentials of medical education, consultations, advice, survey evaluation, and annual listings of the approved medical schools. The two mentioned organizations have exerted great influence in medical education in the United States. They have cooperated in stimulating and encouraging new medical schools and assisting in the improvement of those in existence where such assistance was indicated. They have discouraged only the schools that did not have facilities, finances, or faculty potentials with promise of reasonably sound educational experiences for medical students. Their objectives have been straightforward, sincere, and directed toward the development of physicians well qualified in the diagnosis, prevention, and treatment of human ailments in keeping with progressive scientific knowledge. Contrary to a common misconception, these organizations have not endeavored to control the number of physicians graduated by the schools. They have advised against medical schools undertaking to admit more students than their faculties or facilities could possibly justify, if they were to be properly educated.

Since the turn of the century the Association has also collaborated with the medical licensing bodies of the states. The Federation of State Medical Boards was founded in 1912 as a voluntary organization of the legally constituted licensing bodies. The Federation and its constituent licensing boards depend upon the Council for verification of the credentials of applicants for licensure. In general, they also depend upon the Council's evaluation of the applicant's education, by reference to listings of medical schools and hospitals maintaining acceptable educational programs. In some instances the medical practice act of the state makes use of these lists mandatory. Elsewhere they are employed by regulation of the boards.

In its efforts to gain and maintain the highest possible standard of medical education and hence the highest possible standard of medical care for the American public, the American Medical Association has frequently been criticized by those who do not know the facts. It is accused of suppressing the study of medicine and creating an artificial shortage of doctors. Nothing could be further from the truth. The physical facilities, the availability of qualified instructors, the availability of teaching material and patients for the clinical phases of medical education place definite limits on the number of medical students who can be adequately educated. Increase in the number of students above these limits will result unfailingly in a lower standard of medical education. Increased numbers of inadequately trained physicians will serve only to destroy the high standard of medical care which has been developed over the past half century. Many well-intentioned proposals would lead, in our judgment, to a lowering of the educational standards and the standards of medical care. As physicians we must and do vigorously oppose such proposals. We support just as vigorously those proposals which we believe will improve medical education and the quality of medical care.

With your permission, Mr. Chairman, Dr. Wiggins will present the viewpoint of the Association on the specific proposals before your Committee.

STATEMENT OF DR. WALTER S. WIGGINS ON S. 1323 AND PART E, S. 434 BEFORE SENATE SUBCOMMITTEE

I am Dr. Walter S. Wiggins of Chicago, Illinois. I am Associate Secretary of the Council on Medical Education and Hospitals of the American Medical Association. My testimony will be directed, as Dr. Blasingame has indicated, to the specific measures under consideration by your Committee.

At the outset I should like to state that the Association supports S. 1323. On the other hand, we oppose Part E of S. 434 dealing with assistance to medical and nursing schools. I should like to emphasize that although we suggest modifications in S. 1323, the measure has the approval of the American Medical Association.

You gentlemen are aware of the general position of the Association with respect to federal aid. We believe it to be a dangerous device because of the degree of regulation which must necessarily accompany federal funds. In cases of demonstrated emergency, however, and as a temporary measure, we feel that federal assistance is sometimes proper.

There is a definite need for additional financial support of our medical schools. One of the most acute areas of need is for assistance in the expansion, construction, and remodeling of physical facilities. We feel that this need is great enough to justify a one-time expenditure of federal funds, on a matching basis, and in a manner assuring maximum freedom of the schools from federal control.

S. 434 and S. 1323 represent two radically different approaches to the provision of federal aid to medical education. S. 434 would establish a permanent program of federal subsidy, paying annually to the schools sums of $500 or $1,500 for each medical student enrolled. The higher sum would be available on a per capita basis to the extent that enrollment was increased over the average past enrollment. No local matching of these funds would be required, and it is intended that the federal aid money be used for staff and faculty salaries, operation and maintenance of facilities, and acquisition of equipment.

The continuing subsidy, provided in this bill, would, in our opinion, inevitably lead to undesirable regulation of the schools. We appreciate that the bill contains a section designed to minimize this risk, but we feel certain that once the continued financial support of the nation's medical schools was established as a proper role of the federal government, no one could prevent subsequent federal direction of medical education. Further, the wide spread between the $500 to be paid for each student up to the average past enrollment and the $1,500 to be paid for each additional student offers a financial premium which is hard to resist and which might induce certain schools to enroll more students than they can properly accommodate. The high quality of medical care enjoyed by the people of the United States today is basically the result of the improvements in medical education that have taken place in this country during the past 40 years. To dilute the quality of medical education by inducing the medical schools to increase the volume of students beyond their capacity would, in the long run, result in a deterioration of the medical care available to the American people. For the above reasons and since the construction aid provisions of S. 434 duplicate the proposals in S. 1323, the American Medical Association recommends against the enactment of this measure.

Very different from a continuing operational subsidy is the one-time aid to construction proposed in S. 1323. On June 13, 1951, the House of Delegates of the American Medical Association adopted a resolution calling for: "A one-time federal grant-in-aid on a matching basis, based on the Hill-Burton Act formula and administrative machinery, for construction, equipment and renovation of the physical plants of medical schools. No part of the funds shall be used in any manner for operational expenses or salaries." As we understand S. 1323, the measure is sufficiently close to the type of program recommended by the Association to merit our support.

The stated purpose of the bill is to authorize a five-year program of grants for construction of medical educational and research facilities. It would amend the Public Health Service Act by adding an additional title authorizing appropriation of 50 million dollars for Fiscal Year 1956 and a like amount for each of the four succeeding fiscal years. This money would be used for matching grants to assist public or nonprofit accredited medical schools in the construction, expansion, remodeling, and alteration of teaching and research facilities.

The program would be administered by the Surgeon General of the Public Health Service, advised by a thirteen-member Federal Council on Medical Educational Facilities. Six members of the Council would be appointed from the general public and six members from among leading medical and scientific authorities skilled in health sciences. Appointments would be made by the Surgeon General with the approval of the Secretary of Health, Education and Welfare. The Surgeon General would be the thirteenth member, and Chairman, ex officio, of the Council.

Grants would be for the purpose of constructing new approved medical schools and for improving and expanding facilities of existing medical schools. Any existing or proposed school could obtain a grant of $25,000 for initial planning. Thereafter, addi-

tional grants would be limited to 50% of the cost of construction or alteration of existing schools, and 66⅔% of the cost of construction of new schools, except that existing schools could also obtain grants up to 66⅔% of the cost of construction or alteration by giving adequate assurances that freshman enrollment would increase 5% over 1954-1955 figures. Total grants to any one school over the five-year period could not exceed 3 million dollars.

Schools desiring grants would file applications with the Surgeon General, giving adequate assurances that they would operate as public or nonprofit medical schools, and comply with the Surgeon General's regulations, to be made under the new law. The bill spells out, however, that it does not authorize federal control over curriculum, administration or admissions.

At the discretion of the school, 20% of a grant for new construction may be allocated to permanent endowment for maintenance of the new facility. Otherwise, the bill provides no funds for operation or other maintenance.

We believe that S. 1323 will afford badly needed construction assistance to the nation's medical schools with a minimum risk of undesirable federal control. We feel, however, that the suggestions which we offer for its amendment will make it a better bill.

First, we are concerned that the bill needlessly establishes a precedent for urging or inducing medical schools to increase their enrollment more rapidly than is justified by their facilities, personnel, and teaching material. We have no reason to believe that a 5% increase in freshman enrollment at the present time would be detrimental to the quality of medical education offered in most schools, however, it is possible that such an increase in succeeding years would be unwise. We feel obligated to point out the dangerous principle which is being established and to urge the Committee to amend the bill to remove this unnecessary feature. We are certain that schools capable of increasing enrollment will do so without prompting.

The American Medical Association and the medical schools have every desire to increase the output of adequately trained physicians. We are, however, very much concerned with maintaining the high quality of medical education. As physicians, we would be remiss in our obligations if we failed to point out the dangers in establishing this precedent.

S. 1323 provides for the appointment of a Federal Council on Medical Educational Facilities. We would prefer that the Congress spell out with greater detail the composition of this Council. Specifically, we recommend an amendment to provide that six members be selected from among leading medical authorities and that the public members include persons skilled in the broad aspects of engineering, education, finance and architecture. We believe that a council so composed would better assure the successful administration of the program.

To avoid misunderstanding, let me summarize the position of the American Medical Association on these two bills. We support S. 1323. We feel that it is a timely and proper approach to the provision of federal assistance, on a temporary and limited basis, in an area where an urgent need has been clearly demonstrated. We believe, however, that the amendments which we have recommended will make it a better bill. On the other hand, we oppose Part E of S. 434 because it is permanent in nature and would establish a continuing federal subsidy leading ultimately to federal control of medical education. Because of our approval of the construction grant provisions of S. 1323, we do not support the similar provisions of S. 434.

DR. WILSON LEAVES COUNCIL POST

Effective as of May 1, Dr. James R. Wilson left the A. M. A. as Secretary of the Council on Foods and Nutrition. Dr. Wilson had been with the A. M. A. since 1946. As a consultant to several firms, he will remain active in the field of foods and nutrition. Before leaving, Dr. Wilson was guest of honor at an informal party tendered by his staff at headquarters.

DR. VOLLAN NAMED DEAN OF MEDICAL SCHOOL

Dr. Douglas B. Vollan, formerly assistant secretary of the A. M. A. Council on Medical Education and Hospitals, has been named dean of the faculty of Chicago Medical School. Dr. Vollan, a native of Chicago, took over his new duties on April 1.

LEGAL MEDICINE SESSION AT ATLANTIC CITY MEETING

The A. M. A. Committee on Medicolegal Problems again will sponsor a session on legal medicine at the A. M. A. meeting in Atlantic City in June, on Wednesday, June 8, at 2 p. m. in Room A, Convention Hall. The program, which should prove interesting to both physicians and lawyers, follows:

(1) The Mentally Ill Patient, competence to (*a*) consent to treatment, (*b*) contract, (*c*) testify, and (*d*) make a valid will, Francis J. Gerty, M.D., Chairman, Subcommittee on Forensic Psychiatry, Committee on Medicolegal Problems, Chicago; (2) Trauma and Cancer, W. C. Hueper, M.D., Chief, Environmental Cancer Section, National Cancer Institute, Bethesda, Md.; (3) The Federal Income Tax Law in Relation to Medical Practice, C. M. Lauritzen, II, LL.B., Member of the Chicago Bar; (4) The Model Post-Mortem Examinations Act, C. Joseph Stetler, LL.M., Director, Law Department, American Medical Association, Chicago; (5) Human Experimentation, Medicolegal Aspects, Irving Ladimer, J.D., Chief of Special Studies, Welfare and Health Council, City of New York; (6) Chinese Immigration and Blood Tests, Sidney B. Schatkin, LL.B., Assistant Corporation Counsel, City of New York.

SEX EDUCATION PAMPHLETS

A new series of sex education pamphlets is in the final production stages by the Joint Committee on Health Problems in Education of the National Education Association and the A. M. A. Designed primarily for parents, teachers, and youth leaders, some of the pamphlets also are suitable for youngsters, and doctors may want to include them in patient education programs. The five booklets are: (1) "Parents' Privilege," for parents of preschool and early school-age children; (2) "A Story About You," for children, ages 9 to 12; (3) "Finding Yourself," for boys and girls, ages 12-15; (4) "Learning About Love," for both sexes, ages 16-20; and (5) "Facts Aren't Enough," for adults who have responsibility for children or youths that may create a need for an understanding of sex education. The booklets are scheduled for release about May 15 and may be obtained from either the A. M. A.'s Order Department or the NEA headquarters in Washington, D. C. Prices are available on request. The Joint Committee is composed of five physicians and five educators representing the sponsoring organizations.

NEW TYPE OF HEALTH EXHIBITS PLANNED

The A. M. A.'s Bureau of Exhibits is planning a new series of exhibits depicting the basic anatomy of the human body. Each exhibit will feature life-sized, three-dimensional models of parts of the body and should prove invaluable as a health education aid. Typical of this new group of exhibits is "Life Begins," which tells the story of the beginnings of life. Actual human fetuses embedded in plastic will trace the growth of a baby from four weeks to nine months. Also included will be a three-dimensional life-sized model of the female pelvis and diagrams showing the uniting of the sperm and ovum, the division of cells, and the travel of the ovum into the uterus. The final section of the exhibit will portray in life size the actual delivery of a baby. This exhibit will be available about Sept. 15. Others in the series, scheduled for release next year, will be on vision and hearing. Tentative titles are "We See" and "We Hear." The first exhibit, "You and Your Body," is currently available.

REGIONAL LEGISLATIVE CONFERENCES

Dates have been set for six regional legislative conferences that the Board of Trustees authorized the A. M. A. Committee on Legislation to sponsor in the fall. The purpose of the meetings is to discuss in detail the many medical bills pending in Congress. The fall meetings will be held in six different cities, with attendance being made up of representatives from surrounding states. The dates, meeting places, and chairmen for each meeting follow: Sept. 24, San Francisco, Dr. J. Lafe Ludwig, chairman; Oct. 8, Chicago, Dr. Harlan English, chairman; Oct. 15, Omaha, Drs. Joseph D. McCarthy and McKinnie Phelps, co-chairmen; Oct. 29, New York, Dr. David B. Allman, chairman; Nov. 6, Atlanta, Ga., Drs. Reuben Chrisman and Clark Bailey, co-chairmen; and Nov. 19, Dallas, Texas, Dr. John McDonald, chairman.

MEDICAL NEWS

ARKANSAS

State Medical Meeting at Hot Springs.—The 79th annual session of the Arkansas Medical Society will convene at the Arlington Hotel, Hot Springs, from May 30 to June 1. Dr. William R. Brooksher, Fort Smith, will deliver the president's address at 9 a. m., and in the afternoon there will be symposiums on internal medicine, obstetrics, and gynecology. Surgical and pediatric symposiums will be held Tuesday afternoon, and the "What's New" symposium is scheduled for Wednesday noon. Dr. Peter C. Kronfeld, Chicago, will speak on glaucoma at the Tuesday morning meeting of the eye, ear, nose, and throat section, and Dr. Samuel Fomon, New York City, will present "Place of Rhinoplasty in Ophthalmology" at the section luncheon. Other out-of-state speakers and their first presentations include:

Regional Ileitis, Burrill B. Crohn, New York City.
Headache Mechanisms, Stewart Wolf, Oklahoma City.
X-Ray Signs of Small Bowel Dysfunction, Fred J. Hodges, Ann Arbor, Mich.
Gynecological Surgery in Geriatric Patient, Joseph H. Pratt, Rochester, Minn.
General Practitioner and Sterility Problem, James H. Ferguson, New Orleans.
Surgical Treatment of Pancreatitis, James T. Priestly, Rochester, Minn.
Cardiac Arrest, Henry Swan, Denver.
Non-Operative Management of Problem of Backache, Carroll B. Larson, Iowa City.
Points Often Overlooked in Examining Children, Ernest H. Watson, Ann Arbor, Mich.
Advances in the Basic Sciences, Orville T. Bailey, Indianapolis.

The woman's auxiliary will hold its annual session simultaneously.

COLORADO

Intern-Resident Clinics.—Dr. Carl A. Moyer, professor of surgery, Washington University School of Medicine, St. Louis, will serve as guest clinician at the sixth annual Colorado Intern-Resident Clinics, sponsored by the University of Colorado Medical Center in Denver, June 2-3. He will participate in the discussions and on Thursday evening will deliver the annual Intern-Resident Lecture on the subject "Surgical Adventure." The meeting has been organized and prepared by the interns and residents of Colorado. The two morning sessions will consist of case presentations. The two afternoon programs will be devoted to papers by members of the intern and resident staffs in which the results of their own investigations will be presented. Two awards will be made for the most meritorious papers: the George B. Kent Intern award, consisting of a certificate and $100, and the George B. Kent Resident award, consisting of a certificate and $200. The annual Lederle reception and banquet for all interns and residents and their ladies will be held Friday evening.

CONNECTICUT

Society Plans New Home.—The Hartford Medical Society recently announced that it would build a new $350,000 home on the southeast corner of Albany Avenue and Scarborough Street. The building, which will bear the name of the present headquarters, the Hunt Memorial, will serve an estimated 1,000 physicians in the area.

Guest Speakers at Hartford Hospital.—In its guest speaker program, Saturdays at 11 a. m. in the amphitheater, the Hartford Hospital presents Dr. Siegfried J. Thannhauser, professor of medicine, emeritus, Tufts College Medical School, Boston, who will give case presentations June 4, and Franklin Hutchinson, Ph.D., assistant professor of radiation physics, Yale University School of Medicine, New Haven, whose topic on June 11 will be "The H Bomb and the Doctor."

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

DISTRICT OF COLUMBIA

Freedmen's Interns and Residents Convention.—The Association of Former Internes and Residents of Freedmen's Hospital will hold its annual convention, May 31-June 2, in Washington, D. C., under the presidency of Dr. William A. Warfield Jr., son of the late founder and first president of the association. The scientific meetings and exhibits will be held in the new school of architecture and engineering of Howard University, Washington, D. C. Speakers from the following institutions will appear on the program: University of Minnesota Hospitals, Minneapolis; Homer G. Phillips Hospital, St. Louis; the Harriet Lane Home for Children, Johns Hopkins Hospital, Baltimore; Saint Elizabeths Hospital, Washington, D. C.; State University of New York College of Medicine; Boston Lying-In Hospital, Harvard Medical School, Boston; Meharry Medical College, Nashville, Tenn.; Henry Phipps Institute, University of Pennsylvania, Philadelphia; National Institutes of Health, Bethesda, Md.; National Cancer Institute; National Institute of Neurological Diseases and Blindness; and the George Washington, Georgetown, and Howard University medical schools of Washington, D. C.

ILLINOIS

Psychiatric Lectures.—In its second series on treatment in psychiatry, the North Shore Health Resort, 225 Sheridan Road, Winnetka, offers a lecture, "The Effect of Psychiatric Treatment upon the Patient's Goals," by Dr. Jacob E. Finesinger, professor and head, department of psychiatry, University of Maryland School of Medicine, Baltimore, June 1, 8 p. m., at the health resort.

Chicago

Seniors Participate in Alumni Program.—During the annual reunion of the alumni association of the University of Chicago School of Medicine, the graduating seniors will present on June 3, 7-9 p. m., at Billings Hospital (Pathology 117) a program of reports of research done as part of their training.

Cook County Hospital Alumni Reunion.—The Cook County Hospital Interns' and Residents' Alumni Association will hold a reunion June 3 at the hospital, with clinical meetings (9 a. m. to 1 p. m.), luncheon, a business meeting, and a tour of the hospital. At 7 p. m. a social gathering at the Conrad Hilton Hotel will precede the reunion dinner. Dinner reservations ($10 each) may be made by mailing a check to Dr. William J. Baker, Secretary-Treasurer, 7 W. Madison St., Chicago 2.

Course in Neurology and Psychiatry.—Northwestern University Medical School announces a graduate training program in neurology for residents and fellows at Northwestern University Center for Graduate Training. The first year will be spent at a large general hospital; the second year at the Veterans Administration Hospital, Hines, Ill., which has a 225-bed neurological service and a 250-bed special unit for patients with spinal cord injuries or disease; and the third year at the Veterans Administration Research Hospital (Northwestern campus), which has a 24-bed neurological service. Participants may work toward the degree of M.S. or Ph.D. in neurology. Each training year starts July 1. Salaries, which begin at $2,400 per year, are increased during the three years. Communications should be forwarded to Dr. Benjamin Boshes, Chairman, Department of Neurology and Psychiatry, Northwestern University Medical School, Chicago.

Dr. Alexander to Go to California.—Dr. Franz G. Alexander, founder of the Institute for Psychoanalysis of Chicago in 1932 and its director since that time, is on leave of absence as a senior consultant at the Ford Foundation's Center for Advanced Study in the Behavioral Sciences in Stanford, Calif. He will return to Chicago in January, 1956, for his final year of leadership of the institute at 664 N. Michigan Ave. Dr. Alexander plans to live in Los Angeles, where he will be director of the

psychiatric research center of the new Mount Sinai Hospital. A native of Budapest, Dr. Alexander was on the staff of the Berlin Institute for Psychoanalysis before coming to Chicago. He is a former president of the American Psychoanalytic Association and is a clinical professor of psychiatry at the University of Illinois College of Medicine.

INDIANA

Dr. Campbell Honored.—Dr. Guy G. Campbell, Munster, was recently made commander, The Order of the Star of Honour of Ethiopia, in a ceremony at the Ethiopian Embassy in Washington, D. C. The citation reads: "For your distinguished service in the field of public health during your term of office in Ethiopia, the Imperial Ethiopian Government has seen fit to confer upon you Commander, The Order of the Star of Honour of Ethiopia." Dr. Campbell was principal advisor to the Ministry of Health of the Ethiopian government from November, 1944, until September, 1948. In 1916 he was requested to go to British North Borneo, where he carried out campaigns of nutrition and health for the laborers on various rubber plantations. In recognition of this work, he was gazetted "Government Medical Consultant, Interior" by the British North Borneo government in 1930. After private practice in Indiana from 1932 to 1937, he went to Liberia as medical director for the Firestone Plantations, serving in this capacity until 1943.

MARYLAND

Personal.—Dr. Elijah Adams, a member of the section on biochemical pharmacology, National Institute of Arthritis and Metabolic Diseases, Bethesda, has been appointed associate professor of pharmacology of the New York University College of Medicine.

Course on Electrocardiographic Analysis.—This course, of graduate caliber, is presented Fridays, 8:30-10:30 p. m., at Prince George's General Hospital, Cheverly, to inform physicians regarding advances in electrocardiography and the practical analysis of electrocardiograms. The course consists of lectures, demonstrations, and small group and round-table conferences. Certificates will be awarded physicians completing the course satisfactorily. The registration fee of $20 includes a mimeographed outline of the course. For information, address Dr. Leslie H. French, Heart Station, Prince George's General Hospital, Cheverly.

NEVADA

Compulsory Attendance at County Society Meetings.—At a recent meeting the Washoe County Medical Society, suite 605, 130 N. Virginia St., Reno, adopted the following amendment to its bylaws, which apply to physicians practicing in Washoe County: "Each Doctor shall attend 50% of the meetings of the Washoe County Medical Society, with the exception of Doctors that are 50 years of age or older with 10 years attendance at the meetings or 55 years of age with 5 years attendance, who may, upon request, be excused from attending meetings. The penalty for all other Doctors for non-attendance shall be a fine of $100, and if a member is fined 2 years in succession, his name shall be given to the Board of Directors for possible suspension or expulsion from the Washoe County Medical Society."

NEW YORK

Passano Award Goes to Cornell Professor.—The board of directors of the Passano Foundation announces that Vincent du Vigneaud, Ph.D., chairman, department of biochemistry, Cornell University Medical College, New York, has been selected as the recipient of the $5,000 Passano Foundation award for 1955. The foundation is sustained by annual contributions from the Williams & Wilkins Company, medical book publishers. The award will be presented Wednesday evening, June 8, during the week of the American Medical Association Annual Meeting in Atlantic City. American Medical Association President-Elect Elmer Hess, Erie, Pa., will speak at the dinner. Officers and trustees of the American Medical Association will be among the guests. Dr. du Vigneaud received the award in recognition of his investigation of the chemical and physiological nature of hormones of the posterior portion of the pituitary gland. This culminated in the identification and synthesis of oxytocin and vasopressin.

Society News.—On May 31 in the English Room at Hotel Utica in Utica, Dr. Richard R. Trail of London, England, will address a meeting sponsored jointly by the Oneida County Tuberculosis and Health Association and the Oneida County Medical Society. Dr. Trail is the medical director of the Papworth Village Settlement located 75 miles north of London.——The recently organized Brooklyn Radiological Society will hold meetings the first Thursday of each month from October to April, inclusive. Temporary officers include Dr. Emanuel Mendelson, Brooklyn, president; Dr. John Pepe, Brooklyn, vice-president; and Dr. Daniel G. Butera, Brooklyn, secretary-treasurer.——Mr. J. Louis Neff, who served as executive secretary of the Nassau County Medical Society from 1924 until 1944, has been appointed again to that position to fill the vacancy left at the death of the late Ralph Norton Jr. After leaving the society in 1944, Mr. Neff became executive director of the American Cancer Society and subsequently served as executive director of its Texas division.

New York City

Mental Health Board.—Dr. Sam Parker, director of psychiatry of the department of hospitals, has been designated acting director of the newly created mental health board of the city of New York. Dr. Thomas A. C. Rennie, professor of psychiatry at Cornell University Medical College, was named chairman of the mental health board, and Dr. Basil C. MacLean, commissioner of hospitals, will be chairman of the advisory committee of this board.

Alumnae Day at New York Infirmary.—An alumnae day, sponsored by the Medical Alumnae Association of the New York Infirmary, June 2, will include clinical and round-table discussions. Lunch will be served at the new hospital, Stuyvesant Square East and 15th Street, which was opened in August, 1954, on the same site as the old building, originally founded by Drs. Elizabeth and Emily Blackwell in 1853. Reservations may be sent to Dr. E. Catherine Cline, Secretary, Medical Alumnae Association, New York Infirmary, 321 E. 15th St., New York City 3.

Personal.—Dr. John H. Garlock, who is on a teaching tour of Japan, has been made an honorary fellow of the Chiba Medical Congress and the Tokyo Surgical Congress.——Dr. Ephraim M. Bluestone will deliver the René Sand Memorial Lecture, the opening address of the ninth International Hospital Congress in Lucerne, Switzerland, May 30.——Dr. William S. Collens, attending physician at the Maimonides and Jewish Chronic Disease hospitals in Brooklyn, has been appointed clinical assistant professor of medicine at the State University of New York College of Medicine at New York City, Brooklyn.——The Claude Bernard Lecture of the University of Montreal for 1955 was given March 7, by Dr. Jules T. Freund, chief of the division of applied immunology, Public Health Research Institute of the City of New York, Inc., whose topic was "The Mode of Action of Immunological Adjuvants and Tissue Antigens." Dr. Freund received the Bronze Claude Bernard medal and an honorarium. ——Dr. Moses H. Krakow was voted the 1954 Distinguished Service award by the board of directors of the American Society of Anesthesiologists at the annual meeting in Cincinnati. Dr. Krakow, long-time treasurer of the association and of the New York State Society of Anesthesiologists, has also served as chairman of the A. M. A. Section on Anesthesiology.

NORTH CAROLINA

Course for Practitioners.—Duke University School of Medicine, Durham, will offer a postgraduate course, June 20-23, designed primarily to bring the general practitioner up-to-date in the newest advances in medicine. The series will include pulmonary disease, surgery, treatment of peptic ulcer and tic douloureux, identification of common fungi, and round-table discussions of "The Anxious Patient" and "Vertigo." All lectures are scheduled during morning hours. Afternoon programs will be left open for ward rounds or visits to any of Duke's 39 specialty clinics.

OHIO

Dr. Hattery Honored.—More than 150 physicians and their wives of the Eleventh Councilor District, Ohio State Medical Association, recently gathered in Mansfield to pay tribute to Dr. John S. Hattery, former councilor of the district. A clock, a gift of the host, Richland County Medical Society, and a certificate of merit for his six years of service as councilor were presented to Dr. Hattery. Dr. Charles P. Bailey, professor of thoracic surgery, Hahnemann Medical College and Hospital of Philadelphia, who had conducted a clinic earlier in the day, spoke on techniques of heart surgery. Dr. Merrill D. Prugh, Dayton, president of the Ohio State Medical Association, also was a guest speaker.

PENNSYLVANIA

Three Year Medicolegal Program.—A program for teaching law students the relation of psychiatry to modern legal problems will be developed by the University of Pennsylvania Law School under an $89,640 federal grant made under the National Mental Health Act. This pioneering three year project begins July 1. The project's goals are: to improve communication between psychiatrists and lawyers and evolve effective teaching techniques through their academic collaboration; to compile and publish a coursebook and teacher's guide so that the results may be available to all law schools; to train the individual participants in the project, including the legal and psychiatric co-directors and their research associates; and to accelerate the reception into law of further advances in psychiatry as they occur in the future, by orienting successive generations of law students.

Philadelphia

Centennial Convocation at Children's Hospital.—The Children's Hospital of Philadelphia will hold a centennial medical convocation, June 2-4. A number of foreign guests will present papers, including Prof. Arvid Wallgren of Stockholm, Sweden, Prof. G. Fanconi of Zurich, Switzerland, Professor Gomez of Mexico City, Mexico, Prof. Alan A. Moncrieff of London, England, and Dr. Bernard Schlesinger, chairman, medical staff of Great Ormond Street Hospital for Sick Children, London, England. Among the other guest speakers on the program are Drs. Edwards A. Park, Baltimore, Ernest Caulfield, West Hartford, Conn., Harold K. Faber, San Francisco, Mitchell I. Rubin, Buffalo, and Horace L. Hodes, New York City.

VERMONT

Lecture on Oral Cancer.—Members of the Vermont State Medical Society are invited to a lecture on oral cancer by Kurt H. Thoma, D.M.D., professor emeritus of oral surgery, Harvard University, Cambridge, Mass., at the annual meeting of the Vermont State Dental Society, June 1, at the Equinox House, Manchester. Dr. Thoma's lecture at 10 a. m. will be preceded by a film entitled "Oral Cancer," starting at 9 a. m. This program is sponsored by the Vermont Cancer Society in cooperation with the Vermont State Dental Society.

WEST VIRGINIA

Medical Forums.—The Kanawha Medical Society, in cooperation with the Kanawha Medical Auxiliary, Kanawha Welfare Council, and the Charleston *Gazette*, recently completed a series of four medical forums, held at the municipal auditorium in Charleston. Topics discussed were cancer; sinus, tonsils, and the common cold; diseases of women from youth to old age; and problems of indigestion and ulcers. Many more questions on coupons printed in the Charleston *Gazette* were submitted than could be considered and answered at the forums.

Premature Infant Center Seeks New Sponsors.—The state department of health has withdrawn as sponsor of the premature infant center at Herbert J. Thomas Memorial Hospital in South Charleston because of the decrease in appropriations from the legislature. The center, which has been successfully operated since February, 1948, will nevertheless remain open, and the program will be continued with the same professional staff. The center will operate on a private-pay basis or such other sponsorship as the parents may obtain. Transportation of babies to the premature infant center will be the parents' responsibility. The cooperation of the public is urgently needed because the financial experience of the next three to six months will determine whether the center will continue to operate or be closed permanently. Information concerning the new program may be obtained from Mr. T. W. Patterson, Administrator, Herbert J. Thomas Memorial Hospital, 4605 McCorkle Ave., S.W., South Charleston 3.

WISCONSIN

Meeting on Cardiology.—The Wisconsin Heart Association will hold its annual meeting, June 4, at the Marquette Union in Milwaukee. The speaker at the luncheon will be Dr. James Watt, director, National Heart Institute, Bethesda, Md. There will be special morning sessions for the general public. The afternoon program will include:

Herrman L. Blumgart, Boston, Present Status of the Role of Radioactive Iodine in Treatment of Intractable Heart Disease.
William A. Sodeman, Columbia, Mo., Diagnostic Aspects of Acute Pericarditis.
Charles E. Kossman, New York City, Myocarditis.
James W. Culbertson, Iowa City, Congestive Heart Failure.

There is no registration fee, and membership in the association is not required for attendance.

Diagnostic Center.—The Wisconsin Diagnostic Center in Madison, created for the study, diagnosis, and treatment of mental and emotional illness, particularly in children, handles patients referred by the state department of public welfare and provides

Wisconsin Diagnostic Center in Madison.

clinical training for medical students at the University of Wisconsin. Governor Kohler termed the center "a monument to the creative ingenuity of a leader among us and a tribute to the progress of Wisconsin people" and declared that "Dr. [William D.] Stovall has given his life to the betterment of public health in Wisconsin and, in large measure has been directly responsible for the leadership which has resulted in the expansion and improvement of Wisconsin's facilities for the care of the mentally ill." The center staff is under the direction of Dr. Leslie A. Osborn. A large portion of the building has been sectioned into children's wards and treatment rooms. The building also contains facilities for adults.

Society News.—The Green County Medical Society recently elected the following officers: Dr. Earl V. Hicks, New Glarus, president; Dr. Felix J. Bongiorno, Albany, vice-president; and Dr. Dwain E. Mings, Monroe, secretary-treasurer.——The spring meeting of the Wisconsin Society of Pathologists will be held, June 4, at the Methodist Hospital, Madison, as part of a joint meeting with the Wisconsin Association of Blood Banks, which will convene the preceding day at the Badger Regional Blood Center in Madison. The meeting of the pathologists will include a panel on forensic medicine and a seminar, "Lower Urinary Tract and Male Genitalia," conducted by Dr. Samuel B. Pessin, professor, department of pathology, Marquette University School of Medicine, Milwaukee. Physicians interested in blood banking or pathology are cordially invited to attend the joint meeting.

GENERAL

Standards for Convalescent Homes for Cardiac Children.—The American Heart Association has issued a new manual, "Standards for General Convalescent Homes Caring for Cardiac Children," which provides a check list of the services, facilities, and personnel required in convalescent homes to meet the special needs of children with rheumatic fever or congenital heart defects. Copies of the manual are available from the American Heart Association, 44 E. 23rd St., New York City 10, or from local heart associations.

American Electroencephalographic Society Meeting.—The ninth annual meeting of the American Electroencephalographic Society will convene at the Palmer House, Chicago, June 10-12, immediately preceding the annual meeting of the American Neurological Association. A Symposium on Micro-Electrodes will be held on Saturday from 9:30 a. m. to 12 noon under the chairmanship of Dr. Herbert H. Jasper, Montreal, Canada, and a Symposium on Clinical EEG Interpretation (head injuries) on Sunday at the same hours, under the chairmanship of Dr. Frederic A. Gibbs, Chicago. The annual banquet will be Saturday, 7:30 p. m.

Nursing Recruitment Aids.—The National League for Nursing announces the publication of three new nurse recruitment aids: a list of schools of professional nursing in 1954; a chart, "Opportunities in Professional Nursing"; and an illustrated brochure, "Careers in Nursing—Handbook for Counselors." Single copies of "Schools of Professional Nursing—1954" and the "Opportunities in Professional Nursing" chart are available without charge from the Committee on Careers, National League for Nursing, 2 Park Ave., New York 16. Single copies of "Careers in Nursing—Handbook for Counselors" may be purchased from the same source for 25 cents.

Protection Against Atomic Radiation.—The World Health Organization has decided to give first priority to the problems of health protection against atomic radiation in its new program in the field of atomic energy. Dr. M. G. Candau, director general, Geneva, Switzerland, stresses the need for early planning to avoid public health dangers arising from a new type of industrial development made possible by atomic energy. The long-term program includes protection of people working with radiation, public health protection of the community, collection and dissemination of relevant information, help in training personnel in protection measures, and exchange of scientific information.

Society for Investigative Dermatology.—The Society for Investigative Dermatology will hold its 16th annual meeting at the Ritz-Carlton, Atlantic City, N. J., June 4-5. The sessions will open with the presidential address, "Clinical Investigation in Dermatology," by Dr. Clarence S. Livingood, Detroit, and will close with "Experimental Ecthyma Contagiosum," by Drs. Clayton E. Wheeler, Michael Potter, and Edward P. Cawley of the University of Virginia School of Medicine, Charlottesville. In all, 34 papers will be read. Members, guests, and their ladies are invited to the cocktail party and dinner on Saturday, 7 p. m. ($10 per person).

Session on Tuberculosis.—The American Academy of Tuberculosis Physicians has scheduled its annual meeting for June 4 at the Ritz-Carlton Hotel, Atlantic City, N. J. Dr. Carl H. Gellenthien, Valmora, N. Mex., president, will preside at the sessions, at which 19 papers will be read. Consideration of "Theoretical Basis of Multiple Chemotherapy," by Waclaw Szybalski, Rutgers University, New Brunswick, N. J., will open the morning program, and "Treatment of Tuberculous Meningitis," by Drs. Harold W. Spies and Mark H. Lepper of the Chicago board of health, will initiate the afternoon session.

Offers for Residency Posts.—The Interamerican Foundation for Postgraduate Medical Education requests offers from recognized hospitals for residency posts in all specialties for physicians from Latin America, specially selected for graduate training in hospitals in the United States. These physicians will have a good command of spoken and written English. The hospitals must be approved by the U. S. State Department for the exchange-visitor program. Interested hospitals are requested to communicate with the Interamerican Foundation for Postgraduate Medical Education, 112 E. Chestnut St., Chicago, giving offers of posts and terms of appointment, including maintenance, stipend, and also the allotted number for the exchange-visitor program.

Ophthalmologists Meet in White Sulphur Springs.—The American Ophthalmological Society will hold its 91st annual meeting, June 2-4, at the Greenbrier, White Sulphur Springs, W. Va., under the presidency of Dr. Everett L. Goar, Houston, Texas. The sessions will open with "Progress of Ophthalmology Throughout the World, a Challenge to Leading Ophthalmologists," by Dr. Moacyr E. Alvaro, São Paulo, Brazil, followed by "The Importance of Ophthalmoscopic Photographs in Forensic Medicine," a Kodachrome-illustrated lecture by Dr. Arthur J. Bedell, Albany, N. Y. The 20 presentations include "Progressive Nuclear Ophthalmoplegia," by Dr. William John Holmes, Honolulu, Hawaii, and invitational participation by 10 physicians.

Meeting of Gastroscopic Society.—The American Gastroscopic Society will hold its annual meeting in the Haddon Hall Hotel, Atlantic City, N. J., June 2, at 2 p. m. (D. S. T.). The following program will be presented:

Gastric Biopsy: Techniques of Gastric Biopsy, C. Wilmer Wirts, Philadelphia; Major Contributions of the Gastric Biopsy, Paul L. Shallenberger, Sayre, Pa.

Study of Exfoliated Gastric Cells: Collection of Gastric Cells for Cytologic Examination, Ruth Graham; What Exfoliated Gastric Cells Can Tell, Cyrus E. Rubin, Seattle; Basic Pathology Underlying Successes and Failures of Cyto-Diagnosis, Eleanor Humphreys, Chicago.

Oesophagoscopy: The Gastroscopist's Adaptation to Oesophagoscopy, A. Ray Hufford, Grand Rapids, Mich.; Instrumental Perforations of the Oesophagus and Their Treatment, John Tilden Howard, Baltimore.

A general discussion will follow the presentation of each subject.

Meeting of Vascular Surgeons.—The ninth annual meeting of the Society for Vascular Surgery will convene at the Hotel Dennis, Atlantic City, N. J., June 5, under the presidency of Dr. Robert R. Linton, Brookline, Mass. The presidential address, "Some Practical Considerations of Blood Vessel Surgery," will be preceded by presentation of "Sympathetic Block in Apoplexy," by Dr. Geza de Takats, Chicago. At 2 p. m. the afternoon session will open with "Clinical Grading of the Severity of Obliterative Arterial Disease of the Lower Extremities," by Dr. John J. Cranley, Cincinnati, after which "The Laboratory Assessment of Digital Vascular Disease. A Comparison of Methods" will be considered by Dr. B. N. Catchpole, F.R.C.S., Manchester, England (by invitation) and Dr. Fiorindo A. Simeone, Cleveland. Twenty-three guests will participate by invitation during the 17 presentations.

Gastroenterology Meeting.—The 56th annual meeting of the American Gastroenterological Association will convene at the Hotel Claridge, Atlantic City, N. J., June 3-4, under the presidency of Dr. Dwight L. Wilbur, San Francisco, whose address will be delivered Saturday, 9 a. m. The Friday session will open at 9:30 a. m. with "Comparison of Experimental Esophageal Pain with Spontaneous Pain of Angina Pectoris and Esophageal Disease," presented, by invitation, by Drs. Philip Kramer and William Hollander, Boston. The first annual Memorial Lecture of the American Gastroenterological Association, "Hematemesis and Melena," will be delivered Saturday at 2 p. m. by Dr. F. Avery Jones, London, England. The sessions will close with presentation of "Studies on the Motility of the Distal Colon: Congenital Megacolon," by Drs. Murray Davidson, Marvin H. Sleisinger, Herman Steinberg (by invitation), and Dr. Thomas P. Almy, New York City.

Cardiovascular Research.—The American Heart Association recently approved 122 awards to investigators and research fellows for studies to be conducted during the fiscal year beginning July 1, bringing its support to cardiovascular research above 10 million dollars. Totaling $724,800—nearly 50% more than the $509,300 allocated to investigatorships and fellowships last year—the new awards provide for three career investigatorships, 49 established investigatorships, and 71 research fellowships of the American Heart Association. Announcement will be made later of awards in the grant-in-aid category, which last year ac-

counted for $480,756 in the program of research support financed jointly by the American Heart Association and its affiliates. According to the association's newly issued 1954 annual report, "Speaking from the Heart," affiliated heart associations have expended more than 6 million dollars to advance the search for new knowledge in the cardiovascular field since the association became a voluntary health agency in 1948.

Meeting of Endocrine Society.—The 37th meeting of the Endocrine Society will convene, June 2-4, at Haddon Hall Hotel, Atlantic City, N. J., under the presidency of Dr. Allan T. Kenyon, Chicago. Topics for discussion include thyroid (Thursday morning); hypothalamus and pituitary (Thursday afternoon); reproduction and sex hormones (Friday morning); cortisol derivatives and aldosterone (Friday afternoon); and adrenals (Saturday morning). Saturday afternoon the society will hold a joint session with the American Diabetes Association, during which the Banting Memorial Lecture, "Influence of Epinephrine and Glucagon on Enzyme Systems in Liver and Muscle," will be delivered by Dr. Carl F. Cori, St. Louis. The annual dinner Friday, 7:30 p. m., will be preceded by cocktails sponsored by the donors of the awards of the society. These awards, which will be presented at the dinner, include: the Endocrine medal; Ciba award; Schering scholarship; Ayerst, McKenna and Harrison fellowship; and Upjohn scholarship.

Meeting of Proctologists.—The 54th annual meeting of the American Proctologic Society will be held at the Hotel Statler, New York City, June 1-4, under the presidency of Dr. A. W. Martin Marino, Brooklyn, N. Y. All meetings are open to the medical profession. Sessions on Wednesday will include the following lectures on basic sciences by New York physicians:

Henry T. Randall, General Principles of Water and Electrolyte Balance in Gastrointestinal Tract Surgery.

Benjamin G. Shafiroff, Autonomic Nervous System of Colon and Rectum.

Emery A. Rovenstine, Pharmacology of Local Anesthetic Agents.

Frank L. Meleney, Rationale for the Prophylactic and Therapeutic Employment of Antibiotics as an Adjunct to Surgery of the Alimentary Tract.

Other featured speakers will include Drs. Herman Steinberg, Parker Vanamee, Herbert S. Kupperman, Arthur Purdy Stout, Maurice N. Richter, and Ernest W. Lampe, New York City. From Thursday to Saturday, technical papers by members and guest speakers will be presented.

Conference of Social Work.—The 82nd annual forum of the National Conference of Social Work in San Francisco, May 29-June 3, at the civic auditorium, will have as its theme "Social Welfare 1955—Progress, Problems, Prospects." The California Conference of Social Work has scheduled a program, "The President, the Doctor and You" for Saturday afternoon, which is described as "a 'meet the press' type of program on the impact on Californians of President Eisenhower's proposal for health insurance, medical care of the indigent, rehabilitation programs, permanently and totally disabled assistance, hospitals for the chronically ill. . . ." Sunday afternoon there will be a general session on the availability of medical care, in which Mrs. Oveta Culp Hobby, secretary, Department of Health, Education, and Welfare, Washington, D. C., will deliver an address. Physicians who will participate in the conference include: Russel V. Lee, Palo Alto, Calif.; Harris B. Peck, New York City; George A. Gross and Lester Breslow, Sacramento, Calif.; Jurgen Ruesch and Harold E. Mann, San Francisco; E. Richard Weinerman, El Cerrito, Calif.; and Kent A. Zimmerman, Oakland, Calif.

Conference of Medical Society Executives.—The eighth annual meeting of the Medical Society Executives Conference will be held at the Ritz-Carlton Hotel, Atlantic City, N. J., Saturday afternoon, June 4, under the presidency of Mr. Charles Lively, Charleston, executive secretary of the West Virginia State Medical Association. After a short business session, four discussion groups will consider topics submitted by the membership. Mr. Mac F. Cahal, Kansas City, Mo., executive secretary, American Academy of General Practice, will serve as moderator for group 1 (National Medical Organizations); Mr. James A. Waggener, Indianapolis, executive secretary of the Indiana State Medical Association, for group 2 (Large State Medical Societies); John E. Farrell, Sc.D., Providence, executive secretary of the Rhode Island Medical Society, for group 3 (Small to Medium State Medical Societies); and Mr. Thomas P. Cook, Minneapolis, executive secretary of the Hennepin County (Minnesota) Medical Society, for group 4 (Small to Large County Medical Societies). Mr. Merrill C. Smith, Lincoln, executive secretary of the Nebraska State Medical Association, will be installed as president. Immediately after adjournment, Mead Johnson and Company, Evansville, Ind., will be host at the annual cocktail party at the Ritz-Carlton.

Meeting of Angiologists.—The third scientific meeting of the North American chapter of the International Society of Angiology will take place, June 4, at the Chalfonte-Haddon Hall, Atlantic City, N. J. The presidential address, "Dr. Rudolph Matas: The Father of Modern Vascular Surgery," will be delivered at 2 p. m. by Dr. Alton Ochsner, New Orleans. The opening paper, "Significance of the Induced Digital Vasoconstrictor Reflexes," by Dr. Travis Winsor, Los Angeles, will be followed by "Sympathectomy for Arteriosclerosis. Status of 100 Patients 5 Years After Operation," by Dr. Edward A. Edwards, Boston. The morning session will close with panel discussion of "Present Status of Vascular Grafts in the Management of Arterial Diseases," for which Dr. Michael E. DeBakey, Houston, Texas, will be moderator, with Dr. Ralph A. Deterling Jr., New York City, Dr. Charles A. Hufnagel, Washington, D. C., and Dr. Ormand C. Julian, Chicago, as participants. The closing presentation of the sessions will be "The Principles of Excision and Drainage as Applied to Diabetics with Infections of the Foot and Secondary Gangrene," by Dr. Norman Rosenberg, New Brunswick, N. J. The guest speaker at the dinner of the society, 6:30 p. m., will be Prof. R. H. Goetz of the department of surgical research, University of Cape Town Medical School, Cape Town, South Africa, whose paper, "Observations on the Circulatory System of the Giraffe," will be illustrated with slides and a color film.

Meeting of Therapeutic Society.—The American Therapeutic Society will hold its 56th annual meeting at the Shelburne Hotel in Atlantic City, N. J., June 2-5, under the presidency of Dr. Harvey B. Haag, Richmond, Va. The fourth annual Lewis Harvie Taylor Lectureship, "The Natural Course of Systemic Lupus," will be presented on Friday morning by Dr. Philip A. Tumulty, associate professor of medicine, Johns Hopkins University School of Medicine, Baltimore. The Friday afternoon session will open with a symposium on analgesics and sedatives, moderated by Dr. Austin Smith, Chicago. The first Oscar B. Hunter Memorial Award in Therapeutics will be presented to Dr. Jonas E. Salk, Pittsburgh, on Saturday. The presidential address, "Blood and Urinary Changes in Acute Experimental Alcohol Intoxication," will precede the invitational symposium on diagnostic and therapeutic uses of radioisotopes, which will close the scientific sessions Saturday afternoon. Dr. Oscar B. Hunter Jr., Washington, D. C., will serve as moderator for the following invited presentations:

Use of Radioisotopes as Tracers on a Practical Level, Robert J. Fink, Washington, D. C.

Future Uses of Radioisotopes as Tracer Elements, Franklin G. Ebaugh Jr., Bethesda, Md.

Use of Radioisotopes in Therapy on a Practical Level, Commander Richard D. King, Bethesda, Md.

Future Uses of Radioisotopes in Therapy, Gould A. Andrews, Oak Ridge, Tenn.

The president's reception will precede the annual banquet at 8 p. m.

American Life Convention.—Organized in 1906 as a nonprofit voluntary trade association, the American Life Convention announces the 43rd annual meeting of its medical section, June 27-29, at the Homestead Hotel, Hot Springs, Va. Dr. James P. Donelan, medical director, Guarantee Mutual Life Company, Omaha, will deliver the chairman's address at 9:30 a. m. Monday. Greetings will be extended by F. W. Hubbell and Claris Adams, president and executive vice-president, respectively, of the American Life Convention, and Dr. Richard L. Willis, New York City, president, the Association of Life Insurance Medical Directors of America, after which "How Can Organized Medicine and the Insurance Industry Best Serve the American Public?" will be considered by Dr. Elmer Hess, Erie, Pa., President-Elect, American Medical Association, with discussion

by Mr. Howard O. Brower, Chicago, Assistant Secretary, Council on Medical Service, American Medical Association. Other guest presentations include "Effect of Anti-Hypertensive Drugs on Life Expectancy," by Dr. Irvine H. Page, research division, Cleveland Clinic; and "Heredity," by Laurence H. Snyder, Ph.D., dean, graduate college, University of Oklahoma, Norman. Tuesday a panel discussion, "Digestive Tract Disorders," will be moderated by Dr. Ralph M. Filson, with Drs. Theodore M. Ebers, Kenneth F. Brandon, Lyon H. Earle Jr., and Robert A. Goodell, all of Hartford, Conn., as participants. A feature of the concluding session will be a paper entitled "Underwriting Impaired Juvenile Risks," by Dr. G. R. Collyer, assistant medical director, The London Life Insurance Company, London, Ontario, Canada.

Conference on Sterility.—The American Society for the Study of Sterility will hold its 11th annual conference at the Ritz-Carlton Hotel, Atlantic City, N. J., June 4-5, under the presidency of Dr. John O. Haman, San Francisco. Meetings on (1) sperm and cervical aspects and (2) semiadoption and evaluation of therapy will be held Saturday morning. Coincidentally the following round-tables will be presented: Interpretation and Value of Basal Body Temperature Curves; Endometriosis; Pelvic Pain; Tuboplasty; Ectopic Pregnancy; and Significance of Retrodisplacement in Sterility Problems. Dr. Robert S. Hotchkiss, New York City, will serve as chairman for motion pictures: 9-11 a. m., Physiology of Menstruation; Ovulation and Tubovarian Mechanism; Paracervical Denervation; Ovulation in the Rat; Fertilization of Rabbit Egg; Medical Effects of Atom Bomb; 11:30 a. m. to 1 p. m., Male Hormone; Studies in Male Sterility; Development of Testis; Testicular Deficiency. After luncheon there will be a meeting on surgical aspects and, simultaneously, the following round-table discussions: Artificial Insemination; Population Problems; Semen Assay; Ovulation Failure; Value of "Fern" and Other Cervical Mucus Tests; Problems of Hirsutism and Amenorrhea; Testicular Biopsy; and Rebound Phenomenon. A social hour and buffet supper are scheduled for 6:30 p. m. Meetings on secretory phase aspects and on psychiatric aspects will be held Sunday morning. The Ayerst Lecture, "Pre-Pubertal Development of the Female Reproductive System," will be delivered by Dr. Edith L. Potter, Chicago, at 12 noon. In all, 26 papers will be presented, and 8 will be read by title.

Conference on Artificial Internal Organs.—The American Society for Artificial Internal Organs has scheduled its annual meeting, June 4-5, at the Hotel Chelsea, Atlantic City, N. J. Dr. Willem J. Kolff, Cleveland, will open the meeting with an address, "Problems and Prospects for Artificial Kidneys in the Future," and will later participate in presentation of "Attempts to Make Disposable Oxygenators Using Cellulose or Polyethylene Tubing with Fly Screen," and "Further Development of the Artificial Kidney of Inouye and Engelberg." Drs. George E. Schreiner and Leonard B. Berman, both of Washington, D. C., will discuss "The Use of Dialysis in Postpartum Renal Insufficiency" and will collaborate in "The Artificial Kidney: Specific Treatment for Acute Salycilate Poisoning." Dr. R. Bronnimann of Berne, Switzerland, will have as his topic "Resin Artificial Kidneys." Other subjects on the morning program include the artificial uterus, an expendable dialyzer as an artificial kidney, and hemodialysis in military medicine. Dr. John H. Gibbon Jr., Philadelphia, will serve as chairman for the afternoon program on artificial heart-lung machines. Dr. Peter F. Salisbury, Beverly Hills, Calif., who will present "Indications for the Use of the Artificial Kidney" on the morning program, will collaborate with Drs. J. H. Miller, Leon Morgenstern, Maurice M. Hyman, Joseph M. Shore, and David State, Los Angeles, in presentation of "Physiological Factors in the Use of the Pump-Oxygenator." Other topics for discussion include artificial heart-lung in pharmacology; intravascular hemolysis following insertion of the Hufnagel Lucite ball valve in the circulation and comparative observations with an elastic silicone valve; and new design for blood pump and oxygenator.

Meeting of Rheumatism Association.—The annual meeting of the American Rheumatism Association will be held on June 3-4 at the Hotel Dennis, Atlantic City, N. J., under the presidency of Dr. Edward W. Boland, Los Angeles. The sessions will open Friday at 9 a. m. with an invitational address, "Chemistry of the Ground Substance of Connective Tissue," by Maxwell P. Schubert, Ph.D., New York City. Friday afternoon a panel discussion, "Newer Analogues of Adrenocortical Steroids," moderated by Dr. Joseph J. Bunim, Bethesda, Md., will include the following invitational presentations:

Biosynthesis and Metabolism of Adrenocortical Hormones, Ralph I. Dorfman, Ph.D., Shrewsbury, Mass.

Relation of Chemical Structure to Biological Activity of Adrenal Cortical Steroids Including the Halogenated Analogs, Josef Fried, Ph.D., New Brunswick, N. J.

Pharmacology and Rate of Metabolism of Hydrocortisone, Cortisone, and Metacortandracin, and the Rate of Synthesis of Hydrocortisone in Man, Ralph E. Peterson, Bethesda, Md.

The Saturday morning session will be in conjunction with the American Council on Rheumatic Fever and Congenital Heart Disease. At the luncheon, 12:30-1:45 p. m., "Research and Education in Rheumatic Disease" will be the topic considered by Dr. Currier McEwen, New York City, American Rheumatism Association; Dr. Russell L. Cecil, New York City, Arthritis and Rheumatism Foundation; and Dr. Ralph E. Knutti, Bethesda, Md., National Institute of Arthritis and Metabolic Diseases. At 2 p. m. the following panel discussion, "Reconstructive Surgery in Arthritis," will have as moderator Dr. J. Albert Key, St. Louis:

Prevention and Control of Arthritic Deformities in the Hand, James E. Bateman, Toronto, Canada.

Reconstruction of the Knee in Rheumatoid Arthritis, Robert L. Preston, New York City.

Reconstructive Surgery of the Hip in Arthritis, Carl E. Badgley, Ann Arbor, Mich.

College of Chest Physicians Meeting.—The 21st annual meeting of the American College of Chest Physicians will convene at the Ambassador Hotel, Atlantic City, N. J., June 2-5. Preconvention seminars have been scheduled for June 1. The scientific sessions will open Thursday at 7:55 p. m. Dr. William A. Hudson, Detroit, president, and Dr. James H. Stygall, Indianapolis, president-elect, will serve as co-chairmen. Presentation of "Evolution of the Chest Specialist," by Dr. Burgess L. Gordon, Philadelphia, will precede the Selman Waksman Lecture, "Modern Concepts of Tuberculosis Therapy," which will be delivered under the sponsorship of the New Jersey chapter, American College of Chest Physicians, by Sir Geoffrey Todd, vice-president, British Tuberculosis Association, Sussex, England. A symposium, "What Is Causing the Increase of Cancer of the Lung?" will be presented at 8:30 p. m. Symposiums on pulmonary emphysema and on cardiac manifestations in chronic pulmonary disease are scheduled for Friday morning and Friday afternoon respectively. The evening session will be devoted to 32 fireside conferences, open for free discussion, that will allow the physician to participate in one or more, as he chooses. The Saturday morning program will include (1) consideration of "Modern Therapy and Rehabilitation in Tuberculosis," by Dr. Richard R. Trail, medical director, Papworth and Enhamalamein Village Settlements, London, England, and (2) a symposium on cardiac surgery. At 2 p. m. Saturday, symposiums entitled "Is Tuberculosis in the Bag?" and "Cardiovascular Research with Special Reference to Treatment" will be presented simultaneously, and a panel discussion, "The Future of the Tuberculosis Sanatorium," is scheduled for 3:35 p. m. The Sunday morning session will open with a symposium, "Occupational Influences in Diseases of the Chest," which will be followed by a lecture series on chest diseases and related problems, beginning at 10:30 a. m. and continuing until midafternoon, when a diagnostic treatment conference will be held at 3:30 p. m. Six round-table luncheons will be held daily at 12 noon. On Thursday the annual college conference luncheon (open to all members of the college) will hear addresses by President Hudson, Dr. Alvis E. Greer, Houston, Texas, and Dr. Theodore H. Noehren, Buffalo. At 4 p. m. Thursday the Council on Hospitals will present an open forum, "Minimum Requirements and Adequate Pay Scales for Sanatorium Personnel." A cocktail party, sponsored by the Panray Corporation, New York City, will precede the annual president's banquet on Saturday, 7:30 p. m.

American Diabetes Association.—The 15th annual meeting of the American Diabetes Association will be held at Chalfonte-Haddon Hall, Atlantic City, N. J., June 4-5. Saturday will be devoted to a joint meeting with The Endocrine Society, which

will open at 2 p. m. with "Hypophysectomy in Severe Juvenile Diabetes: 18 Month Progress Report," by Drs. Laurance W. Kinsell, Lester B. Lawrence (by invitation), and Robert D. Weyand (by invitation), Oakland, Calif., after which there will be a presentation of "The Metabolism of C14-Labeled Glucose in Normal and Diabetic Subjects," by Dr. Max Miller, Dr. Reginald A. Shipley, and, by invitation, Nome Baker, Ph.D., and Drs. Walton W. Shreeve and James W. Craig, Cleveland. "Interactions of Growth Hormone, Cortisone and Tri-Iodothyronine in Experimental Diabetes in the Rat," by Drs. John A. Owen Jr., Morton D. Bogdonoff (by invitation), and Frank L. Engel, Durham, N. C., will precede the Banting Memorial Lecture, "The Influence of Epinephrine and Glucagon on Enzyme Systems in Liver and Muscle," which will be delivered at 3:10 p. m. by Dr. Carl F. Cori, professor of biochemistry, Washington University School of Medicine, St. Louis. The Banting medal will be presented to Dr. Cori, who was Nobel prize recipient in medicine and physiology in 1948, at the banquet Saturday evening. Other presentations at the joint session will include invitational addresses on "Effects of Glucose Levels on Lipogenesis and Oxidation in Rat Liver and Adipose Tissue" and "Distribution and Degradation of I^{131}-Labeled Insulin in Normals and Diabetics." At the banquet, Saturday, 7:15 p. m., addresses will be made by Dr. Henry B. Mulholland, president, Charlottesville, Va., and Mr. Charles F. Kettering, Dayton, Ohio, research consultant and director, General Motors Corporation. The Sunday morning session, which will include an address entitled "Prosthetic Techniques in the Aftercare of Diabetic Gangrene," by Dr. Ewen Downie, Melbourne, Australia, will close with a panel discussion on fluids and electrolytes in therapy. The Sunday afternoon session will open at 2:30 p. m. with "The Lente Insulins," by K. Hallas-Møller, Copenhagen, Denmark, followed by a paper on clinical evaluation of lente insulin in 109 diabetic patients, by Dr. Edgar A. Haunz, Grand Forks, N. D. A panel discussion, "What I Teach My Diabetic Patients," that will conclude the sessions, will be preceded by presentation of "Juvenile Diabetes: Second Clinical Study of Twenty-Five Cases of Twenty-Five Years or More Duration," by Drs. Randolph P. Pillow and Lester J. Palmer, Seattle.

FOREIGN

Treacher Collins Prize Essay.—The council of the Ophthalmological Society of the United Kingdom has instituted a triennial prize of £100 (about $279) for the best essay submitted on a subject selected by the council. The prize is open to qualified medical practitioners of any nationality, but the essay must be written in English. The subject for the next contest is "Diseases of the Lacrimal Apparatus and Their Treatment." Essays should be submitted to the Honorary Secretary, Ophthalmological Society of the United Kingdom, 45 Lincoln's Inn Fields, London, W. C. 2, before Dec. 31, 1956. No name should be on any essay, but a distinguishing pseudonym or quotation on a sealed envelope containing the candidate's name and address should accompany the essay.

International Congress of Biochemistry.—The third annual meeting of the International Congress of Biochemistry will be held in Brussels, Belgium, Aug. 1-6. In all, 32 symposial sessions have been scheduled. Two general lectures will be given at the opening and closing sessions of the congress: "Thyroxin and Oxydative Phosphorylation," by Prof. Carl Martius of the University of Wurzburg, and "Hormones of the Posterior Pituitary," by Vincent du Vigneaud, Ph.D., of Cornell University Medical College, New York. The closing date for registration is May 31. The registration fee is 600 Belgian francs (about $12) for active members and 100 Belgian francs for associate members. Registration may be made through the American Express Company. Further information may be obtained from Prof. C. Liébecq, Place Delcour, Liége, Belgium, secretary-general.

DEATHS IN OTHER COUNTRIES

Dr. Max Neuburger died in his native Vienna at the age of 87, March 15. For over 40 years Dr. Neuburger had taught the history of medicine in the University of Vienna. He had written or edited 17 books and about 180 papers.

MEETINGS

AMERICAN MEDICAL ASSOCIATION: Dr. George F. Lull, 535 North Dearborn St., Chicago 10, Secretary.

1955 Annual Meeting, Atlantic City, N. J., June 6-10.

1955 Clinical Meeting, Boston, Nov. 29-Dec. 2.

1956 Annual Meeting, Chicago, June 11-15.

1956 Clinical Meeting, Seattle, Nov. 27-30.

1957 Annual Meeting, New York, June 3-7.

AMERICAN ACADEMY OF TUBERCULOSIS PHYSICIANS, Ritz-Carlton Hotel, Atlantic City, N. J., June 4. Dr. Oscar S. Levin, P. O. Box 7011, Denver, Secretary.

AMERICAN COLLEGE OF ANGIOLOGY, Brighton Hotel, Atlantic City, N. J., June 4. Dr. Hugh Murphy, 151 East 83d St., New York, Secretary.

AMERICAN COLLEGE OF CHEST PHYSICIANS, Ambassador Hotel, Atlantic City, N. J., June 2-5. Mr. Murray Kornfeld, 112 East Chesnut St., Chicago 11, Executive Director.

AMERICAN DIABETES ASSOCIATION, Chalfonte-Haddon Hall, Atlantic City N. J., June 4-5. Dr. John A. Reed, 1 East 45th St., New York 17, Secretary

AMERICAN ELECTROENCEPHALOGRAPHIC SOCIETY, Palmer House, Chicago, June 10-12. Dr. W. T. Liberson, EEG Research Laboratory, Veterans Administration Hospital, Northampton, Mass., Secretary.

AMERICAN GASTROENTEROLOGICAL ASSOCIATION, Claridge Hotel, Atlantic City, N. J., June 3-4. Dr. H. Marvin Pollard, University Hospital, Ann Arbor, Mich., Secretary.

AMERICAN GASTROSCOPIC SOCIETY, West Room, Haddon Hall, Atlantic City, N. J., June 2. Dr. John Tilden Howard, 12 East Eager St., Baltimore 2, Secretary.

AMERICAN HEARING SOCIETY, Hotel Morrison, Chicago, June 12-14. Mr. Crayton Walker, 817 Fourteenth St. N.W., Washington 5, D. C., Executive Director.

AMERICAN MEDICAL WOMEN'S ASSOCIATION, Hotel Dennis, Atlantic City, N. J., June 2-5. Miss L. T. Majally, 1790 Broadway, New York 19, Executive Secretary.

AMERICAN NEUROLOGICAL ASSOCIATION, Palmer House, Chicago, June 13-15. Dr. H. Houston Merritt, 710 West 168th St., New York 32, Secretary.

AMERICAN OPHTHALMOLOGICAL SOCIETY, Greenbrier Hotel, White Sulphur Springs, W. Va., June 2-4. Dr. Maynard C. Wheeler, 30 West 59th St., New York 19, Secretary.

AMERICAN ORTHOPEDIC ASSOCIATION, Greenbrier Hotel, White Sulphur Springs, W. Va., June 19-22. Dr. George O. Eaton, 4 East Madison St., Baltimore 2, Secretary.

AMERICAN PEDIATRIC SOCIETY, Chateau Frontenac, Quebec, Canada, June 13-17. Dr. Aims C. McGuinness, Medical Laboratories, University of Pennsylvania, Philadelphia 4, Secretary.

AMERICAN PROCTOLOGIC SOCIETY, Hotel Statler, New York, June 1-4. Dr. Karl Zimmerman, 3500 Fifth Ave., Pittsburgh 13, Secretary

AMERICAN RHEUMATISM ASSOCIATION, Hotel Dennis, Atlantic City, N. J., June 3-4. Dr. William H. Kammerer, 33 East 61st St., New York 21, Secretary.

AMERICAN SOCIETY FOR ARTIFICIAL INTERNAL ORGANS, Hotel Chelsea, Atlantic City, N. J., June 4-5. Dr. Peter F. Salisbury, Institute for Medical Research, 4751 Fountain Ave., Los Angeles 29, Acting Secretary.

AMERICAN SOCIETY FOR THE STUDY OF STERILITY, Ritz-Carlton Hotel, Atlantic City, N. J., June 3-5. Dr. Herbert H. Thomas, 920 South 19th St., Birmingham, Ala., Secretary.

AMERICAN THERAPEUTIC SOCIETY, Shelburne Hotel, Atlantic City, N. J., June 2-5. Dr. Oscar B. Hunter Jr., 915 Nineteenth St. N.W., Washington 6, D. C., Secretary.

ARKANSAS MEDICAL SOCIETY, Arlington Hotel, Hot Springs, May 29-June 1. Dr. J. J. Monfort, 215 Kelley Bldg., Fort Smith, Secretary.

ASSOCIATION FOR RESEARCH IN OPHTHALMOLOGY, Dennis Hotel, Atlantic City, N. J., June 7-9. Dr. Lorand V. Johnson, 10515 Carnegie Ave., Cleveland 6, Secretary.

IDAHO STATE MEDICAL ASSOCIATION, Sun Valley, June 19-22. Mr. Armand L. Bird, 364 Sonna Bldg., Boise, Executive Secretary.

MAINE MEDICAL ASSOCIATION, The Samoset, Rockland, June 19-21. Mrs. Esther M. Kennard, 142 High St., Portland 3, Secretary.

MEDICAL SOCIETY EXECUTIVES CONFERENCE, Ritz-Carlton Hotel, Atlantic City, N. J., June 4. Mr. W. H. Bartleson, 3036 Gillham Road, Kansas City 8, Mo., Secretary.

MEDICAL SURGICAL CONFERENCE, Great Falls, Mont., June 20-21. Dr. Carl Nelson, 600 Central Ave., Great Falls, Mont., Secretary.

NORTH AMERICAN CHAPTER, INTERNATIONAL SOCIETY OF ANGIOLOGY, Chalfonte-Haddon Hall, Atlantic City, N. J., June 4. Dr. Henry Haimovici, 105 East 90th St., New York 28, Secretary.

POST GRADUATE MEDICAL ASSEMBLY OF SOUTH TEXAS, The Shamrock, Houston, July 18-20. Dr. C. Forrest Jorns, 412 Jesse H. Jones Library Bldg., Houston, Secretary.

ROCKY MOUNTAIN CANCER CONFERENCE, Shirley-Savoy Hotel, Denver, July 13-14. Dr. Frederick H. Brandenburg, 835 Republic Bldg., Denver 2, Chairman.

SOCIETY OF BIOLOGICAL PSYCHIATRY, Palmer House, Chicago, June 11-12. Dr. George N. Thompson, 2010 Wilshire Blvd., Los Angeles 5, Secretary.

SOCIETY FOR INVESTIGATIVE DERMATOLOGY, Ritz-Carlton Hotel, Atlantic City, N. J., June 4-5. Dr. Herman Beerman, 255 South 17th St., Philadelphia 3, Secretary.

SOCIETY FOR PEDIATRIC RESEARCH, Chateau Frontenac, Quebec, Canada, June 15-18. Dr. Sydney S. Gellis, 330 Brookline Ave., Boston 15, Secretary.

SOCIETY FOR VASCULAR SURGERY, Atlantic City, N. J., June 5. Dr. George D. Lilly, 333 Ingraham Bldg., Miami 32, Fla., Secretary.

SYMPOSIUM FOR GENERAL PRACTITIONERS ON TUBERCULOSIS AND OTHER CHRONIC PULMONARY DISEASES, Saranac Lake, N. Y., July 11-15. Dr. Richard P. Bellaire, P. O. Box 2, Saranac Lake, N. Y., General Chairman.

THE ENDOCRINE SOCIETY, Chalfonte-Haddon Hall, Atlantic City, N. J., June 2-4. Dr. Henry H. Turner, 1200 N. Walker St., Oklahoma City 3, Secretary.

THE SOCIETY OF NUCLEAR MEDICINE, Multnomah Hotel, Portland, Ore., June 17-19. Dr. Arthur H. Livermore, Reed College, Portland 2, Ore., Secretary.

UPPER PENINSULA MEDICAL SOCIETY, Gateway Hotel, Land O'Lakes, Wis., June 17-18. Dr. William H. Wacek, Box 680, Ironwood, Mich., Secretary.

WOMAN'S AUXILIARY TO THE AMERICAN MEDICAL ASSOCIATION, Haddon Hall, Atlantic City, N. J., June 6-10. Miss Margaret Wolfe, 535 N. Dearborn St., Chicago 10, Executive Secretary.

WYOMING STATE MEDICAL SOCIETY, Hotel Connor, Laramie, June 12-15. Mr. Arthur R. Abbey, Box 2036, Cheyenne, Executive Secretary.

FOREIGN AND INTERNATIONAL

AUSTRALASIAN MEDICAL CONGRESS, Sydney, N.S.W., Australia, Aug. 20-27. For information write: Federal Council of the B.M.A. in Australia, 135 Macquaire St., Syndey, N.S.W., Australia.

BRITISH MEDICAL ASSOCIATION, Representative Meeting, London, England, June 1-4. Dr. A. Macrae, B.M.A. House, Tavistock Square, London, W.C.1, England, Secretary.

CANADIAN AND BRITISH MEDICAL ASSOCIATIONS, Joint Meeting, Toronto, Canada, June 20-22. Dr. Arthur D. Kelly, 244 St. George St., Toronto, Canada, General Secretary.

COMMONWEALTH HEALTH AND TUBERCULOSIS CONFERENCE, Royal Festival Hall, London, England, June 21-25. Mr. J. H. Harley Williams, Tavistock House North, Tavistock Square, London, W.C.1, England, Secretary General.

CONGRESS OF INTERNATIONAL ASSOCIATION OF APPLIED PSYCHOLOGY, London, England, July 18-23. Dr. C. B. Frisby, National Institute of Industrial Psychology, 14 Welbeck St., London, W.1, England, President.

CONGRESS OF INTERNATIONAL ASSOCIATION OF PSYCHOTECHNOLOGY, London, England, July 18-23. For information write: Dr. C. B. Frisby, Director, National Institute of Industrial Psychology, 14 Welbeck St., London, W.1, England.

CONGRESS OF THE INTERNATIONAL ASSOCIATION FOR THE STUDY OF THE BRONCHI, Stockholm, Sweden, June 18-19. For information write: Dr. J. M. Lemoine, 187 boulevard St. Germain, Paris 7°, France.

CONGRESS OF INTERNATIONAL DIABETES FEDERATION, Cambridge, England, July 4-8. Mr. James G. L. Jackson, 152 Harley St., London, W.1, England, Executive Secretary General.

CONGRESS OF INTERNATIONAL SOCIETY OF SURGERY, Copenhagen, Denmark, July 23-29. Dr. L. Dejardin, 141 rue Belliard, Brussels, Belgium, General Secretary.

EUROPEAN CONGRESS ON RHEUMATISM, Scheveningen, The Hague, Netherlands, June 13-17. Dr. H. van Swaay, Pieter Bothstraat 12, The Hague, Netherlands, Secretary.

INTERNATIONAL ACADEMY OF LEGAL AND SOCIAL MEDICINE, Plenary Conference, Genes, Italy, Oct. 13-17. Prof. Domenico Macaggi, Institut de Medicine legale, Universite de Genes, Genes, Italy, President.

INTERNATIONAL ANATOMICAL CONGRESS, Paris, France, July 25-30. Prof. Gaston Cordier, 45, rue des Saints-Pères, Paris 6°, France, Secretary General.

INTERNATIONAL CONGRESS OF ALLERGOLOGY, Rio de Janeiro, Brazil, S. A., Nov. 6-13. Dr. Bernard N. Halpern, 197 boulevard St. Germain, Paris 7°, France, Secretary General.

INTERNATIONAL CONGRESS OF ANGIOLOGY AND HISTOPATHOLOGY, Fribourg, Switzerland, Sept. 2-5. For information write: Dr. Gerson, 4 rue Pasquier, Paris 8°, France.

INTERNATIONAL CONGRESS OF BIOCHEMISTRY, Brussels, Belgium, Aug. 1-6. Prof. C. Liebecq, 17 Place Delcour, Liège, Belgium, Secretary General.

INTERNATIONAL CONGRESS OF COMPARATIVE PATHOLOGY, Lausanne, Switzerland, May 26-31. Professor Hauduroy, 19 rue Cesar Roux, Lausanne, Switzerland, Secretary General.

INTERNATIONAL CONGRESS OF CRIMINOLOGY, London, England, Sept. 11-18. For information write: Dr. Carroll, 28 Weymouth St., London, W.1, England.

INTERNATIONAL CONGRESS OF EUROPEAN SOCIETY OF HAEMATOLOGY, Freiburg i,Br., Germany, Sept. 20-24. Prof. Dr. L. Heilmeyer, Hugstetter Strasse 55, Freiburg i,Br., Germany, Chairman.

INTERNATIONAL CONGRESS OF LIBRARIANSHIP AND DOCUMENTATION, Brussels, Belgium, Sept. 11-18. For information write: Dr. A. C. Breycha-Vauthier, Librarian, United Nations, Geneva, Switzerland.

INTERNATIONAL CONGRESS OF MEDICAL PROFESSIONAL JURISDICTION, MEDICAL ETHICS, AND COMPARATIVE MEDICAL LAW, Paris, France, Sept. 30-Oct. 3. Dr. J. R. DeBray, Conseil National de L'Ordre des Medécins, 60, Boulevard Latour-Maubourg, Paris 7e, France, Secretary General.

INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY, Istanbul, Turkey, Aug. 28-Sept. 1. Dr. J. Voncken, International Committee of Military Medicine and Pharmacy, 79 rue Saint Laurent, Leige, Belgium, Secretary-General.

INTERNATIONAL CONGRESS OF NEUROPATHOLOGY, London, England, Sept. 12-17. Dr. W. H. McMenemey, Maida Vale Hospital for Nervous Diseases, London, W.9, England, Secretary.

INTERNATIONAL CONGRESS OF PLASTIC SURGERY, Stockholm, Sweden, Aug. 1-4, and Uppsala, Sweden, Aug. 5. Dr. Tord Skoog, Uppsala, Sweden, General Secretary.

INTERNATIONAL CONGRESS ON URINARY LITHIASIS, Evian, France, Sept. 2-4. Mr. Rossollin-Grandville, Direction Cachet, Evian (Hte-Savoie), France, Secretary General.

INTERNATIONAL GENERAL MEDICAL CONGRESS, University of Rosario Medical College, Rosario, Argentina, S. A., Nov. 7-12. Dean Jose Imhoff, Santa Fé 3100, Rosario, Argentina, S. A., Chairman.

INTERNATIONAL HOSPITAL CONGRESS, Lucerne, Switzerland, May 29-June 3. Capt. J. E. Stone, International Hospital Federation, 10 Old Jewry, London, E.C.2, England, Hon. Secretary.

INTERNATIONAL MEDICAL CONGRESS, Verona, Italy, Sept. 1-4. For information write: c/o Offices of the International Verona Fair, Piazza Bra., Verona, Italy.

INTERNATIONAL OFFICE OF DOCUMENTATION OF MILITARY MEDICINE, Istanbul, Turkey, Aug. 28-Sept. 1. Dr. J. Voncken, 79 rue Saint Laurent, Liege, Belgium, Secretary-General.

INTERNATIONAL SOCIETY FOR THE STUDY OF BIOLOGICAL RHYTHMS, Stockholm, Sweden, Sept. 15-17. For information write: Prof. Ture Petrén, Karolinska Institutet, Stockholm 60, Sweden.

INTERNATIONAL SYNDICATE OF GYNECOLOGISTS AND OBSTETRICIANS, Meeting Hall of Medical Societies, Paris, France, June 27-28. Dr. Jacques Courtois, 1, rue Racine, Saint-Germain-en-Laye (S & O), France, Secretary General.

INTERNATIONAL VITAMIN E CONGRESS, Cini Foundation, Island of San Giorgio Maggiore, Venice, Italy, Sept. 5-8. Prof. Emilio Raverdino, via Pietro Verri 4, Milano, Italy, Secretary.

IRISH MEDICAL ASSOCIATION, Trinity College, Dublin, Ireland, July 4-8. Dr. P. J. Delaney, 10 Fitzwilliam Place, Dublin, Ireland, Secretary.

NEURORADIOLOGIC SYMPOSIUM, London, England, Sept. 13-17. Dr. R. D. Hoare, National Hospital, Queen Square, London, W.C.1, England, Secretary.

PAN AMERICAN CONGRESS OF OPHTHALMOLOGY, Santiago, Chile, S. A., Jan. 9-14, 1956. Dr. Rene Contardo, Huerfanos 930, Of. 74, Santiago, Chile, Secretary General.

PAN AMERICAN CONGRESS ON RHEUMATIC DISEASES, Rio de Janeiro and Sao Paulo, Brazil, S. A., Aug. 14-20. For information write: Dr. Waldemar Bianchi, 126 Avenida Franklin D. Roosevelt, Rio de Janeiro, Brazil, S. A.

VENEZUELAN CONGRESS OF MEDICAL SCIENCES, Caracas, Venezuela, S. A., Nov. 18-26. Dr. A. L. Briceno Rossi, Apartado 4412, Ofic. del Este, Caracas, Venezuela, S. A., Secretary General.

WORLD CONGRESS OF ANESTHESIOLOGISTS, Scheveningen, Netherlands, Sept. 5-10. For information write: Mr. W. A. Fentener van Vlissingen, Noordhoudringelaan, 24, Bilthoven, Netherlands.

WORLD CONGRESS ON FERTILITY AND STERILITY, Naples, Italy, May 18-26, 1956. For information address: Prof. G. Tesauro, S. Andrea della Dame, 19, Naples, Italy.

WORLD CONGRESS OF JEWISH PHYSICIANS, Haifa, Tel-Aviv, Jerusalem, Israel, Aug. 10-17. Dr. Z. Avigdori, P.O.B. 1342, Jerusalem, Israel, Chairman.

WORLD FEDERATION FOR MENTAL HEALTH, Istanbul, Turkey, Aug. 21. For information write: Miss E. M. Thornton, 19 Manchester St., London, W.1, England.

WORLD MEDICAL ASSOCIATION, Vienna, Austria, Sept. 20-26. Dr. Louis H. Bauer, 345 East 46th St., New York 17, N. Y., U. S. A., Secretary General.

EXAMINATIONS AND LICENSURE

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II in 1955.* June 21-22, Sept. 6-7 (Part I only). Candidates may file applications at any time, but the National Board must receive them at least six weeks before the date of the examination. New candidates should apply by formal registration; registered candidates should notify the board by letter and forward their fees. Exec. Sec., Dr. John B. Hubbard, 133 South 36th St., Philadelphia 4.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written.* July 15. Final date for filing applications was Jan. 15. *Oral.* New York City, Oct. 23-27. Sec., Dr. Curtiss B. Hickcox, 80 Seymour St., Hartford 15.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOGY: *Written.* Various centers, June 30. *Oral.* Washington, D. C., Oct. 14-16. Final date for filing application was March 15. Sec., Dr. B. M. Kesten, One Haven Ave., New York 32, N. Y.

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral.* Portland, Ore., Sept. 14-16; Chicago, Nov. 30-Dec. 1. *Subspecialties. Cardiovascular Disease.* Chicago, Nov. 30. The closing date for acceptance of applications for gastroenterology was Feb. 1, and for cardiovascular disease the closing date is June 1. Exec. Sec., Dr. William A. Werrell, 1 West Main St., Madison 3, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* New Haven, November. Oral examinations given in Spring and Fall. Final date for filing application for the Spring examination is October 1; for the Fall examination April 1. Sec., Dr. Leonard T. Furlow, Washington University School of Medicine, St. Louis 10.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Candidates who participated in the Part I examinations will be notified of their eligibility for the Part II examinations. Sec., Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6.

AMERICAN BOARD OF OPHTHALMOLOGY: *Practical Examinations.* Philadelphia, May 27-30; Chicago, Oct. 9-14. Final date for filing application for 1955 practical examination was July 1, 1954. *Written.* January, 1956. Final date for filing application is July 1. Sec., Dr. Merrill J. King, 56 Ivie Road, Cape Cottage, Maine.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Final date for filing application for the Part II examination to be given in January 1956 is Aug 15. Sec., Dr. Harold A. Sofield, 116 South Michigan Ave., Chicago 3.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral.* Chicago, Oct. 3-7. Final date for filing application is April. Sec., Dr. Dean M. Lierle, University Hospitals, Iowa City.

AMERICAN BOARD OF PEDIATRICS: *Oral.* New York City, June 10-12; Chicago, Oct. 7-9; and Washington, D. C., Dec. 2-4. Admin. Sec., Mrs. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION: Philadelphia, June 10-12. The final date for filing applications was March 1. Sec., Dr. Earl C. Elkins, 30 N. Michigan Ave., Chicago 2.

AMERICAN BOARD OF PLASTIC SURGERY: *Oral and Written.* Philadelphia, Sept. 22-24. Corres. Sec., Miss Estelle E. Hillerich, 4647 Pershing Ave., St. Louis 8.

AMERICAN BOARD OF PREVENTIVE MEDICINE: *Certification in Public Health.* Kansas City, Mo., Nov. 10-12. Sec.-Treas., Dr. Ernest L. Stebbins, 615 N. Wolfe St., Baltimore 5.

AMERICAN BOARD OF PROCTOLOGY: *Part II.* Philadelphia, Sept. 17. Sec., Dr. Stuart T. Ross, 131 Fulton Ave., Hempstead, N. Y.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: San Francisco, mid-October; New York City, December. Sec., Dr. David A. Boyd, 102-110 Second Ave. S.W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: Chicago, Dec. 4. Final date for filing applications for the spring examination is July 1. Candidates who will complete their training by Dec. 31 will be eligible to appear for this examination. Sec., Dr. B. R. Kirklin, 429 First National Bank Bldg., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Part I.* Centers throughout the United States, in Europe and in the Far East, Oct. 26 and March 28. Closing date for the October examination is July 1 and for the March examination is December 1. *Part II.* Philadelphia, June 13-14. Sec., Dr. John B. Flick, 255 S. Fifteenth St., Philadelphia 2.

THE BOARD OF THORACIC SURGERY: *Written.* September. Final date for filing applications is July 1. Sec., Dr. Wm. M. Tuttle, 1151 Taylor Ave., Detroit 2.

MAGAZINE–TELEVISION REPORT

The following list of current medical articles appearing in mass-circulation magazines on medical subjects is published each week only for the information of readers of THE JOURNAL. *Unless specifically stated, the American Medical Association neither approves nor disapproves of the articles and programs reported.*

MAGAZINES

Life, May 16, 1955

"Safeguards for the Polio Shots," by Ralph Graves

A step by step description of the poliomyelitis vaccine manufacturing process—including an explanation of controls used.

Cosmopolitan, June, 1955

"Worry," by Martin L. Gross with Dr. Phillip Polatin

Transcript of a tape-recorded interview of Dr. Polatin, associate clinical psychiatrist, New York Psychiatric Institute. Questions and answers point up what can happen with too much worry and how to worry less.

"The Pathologist," by Donald Cooley

A thorough description of the work of pathologists. The author uses Dr. Hollis K. Russell, St. Barnabas Hospital for Chronic Diseases, New York City, as an example of a typical pathologist—showing how he does his work.

Saturday Evening Post, May 14, 1955

"Angels in Bobby Socks," by Bill Hosokawa

Teen-age girls in Akron, Colo., serve as volunteer helpers in the local hospital. They call their organization JUGS—meaning Just Us Girls.

Parents,' June, 1955

"What You Should Know About Your Baby's Eyes," by Edward T. Wilkes, M.D.

The assistant clinical professor of pediatrics at New York Bellevue Postgraduate Center gives mothers advice on nearsightedness, farsightedness, styes, color blindness, and other eye disorders.

"Does the New Vaccine Really Mean the End of Polio?" by Ruth and Edward Brecher

The authors report on answers given by "top polio experts" to the question: "how much benefit can I expect my children to derive from polio vaccination this summer, and through the years ahead?"

Coronet, June, 1955

"I Am a Spastic," by Gene Brown with Jim Stangier

A first person story on the problems encountered by a cerebral palsy victim in adjusting himself to everyday life.

"Should We Legalize Narcotics?" by Herbert Berger, M.D., and Andres A. Eggston, M.D.

"We believe that under a new system of controls—which we have submitted for study by the A. M. A.—the number of [narcotic] addicts could be reduced to a handful within a generation. This new system calls for the establishment of narcotics clinics where drugs would be administered to addicts under medical supervision and with proper safeguards."

Family Circle, June, 1955

"Polio's Last Summer"

The magazine answers questions about poliomyelitis and the new poliomyelitis vaccine. The article concludes with a list of precautionary measures families should take this summer.

DEATHS

Werne, Jacob ⊕ Jamaica, N. Y.; born in New York City Sept. 4, 1903; Baylor University College of Medicine, Dallas, Texas, 1926; interned at the New York City Hospital from 1926 to 1928, when he became resident physician; associate clinical professor of pathology, New York Medical College, Flower and Fifth Avenue Hospitals; certified by the National Board of Medical Examiners; specialist certified by the American Board of Pathology; member of the American Association of Pathologists and Bacteriologists, New York Academy of Medicine, New York Pathological Society, New York State Pathological Society, New York Society for Medical Jurisprudence, American Academy of Forensic Sciences, and the New York State Association of Public Health Laboratories; founding fellow of the College of American Pathologists; fellow of the American College of Physicians; in 1942 president of the Queens County Medical Society, serving as president of its board of trustees in 1945; from 1948 to 1953 chairman, Queens County Cancer Committee, Division of the American Cancer Society; since 1948 member of the board of directors of the New York Cancer Committee; founder and sustaining member of the U. S. Committee, World Medical Association; since 1931 assistant medical examiner in the office of the chief medical examiner in Queens; lieutenant colonel in the medical corps of the U. S. Army Reserve, serving at the Rocky Mountain Arsenal at Denver, and until his discharge March 15, at the research laboratories, Army Chemical Center in Edgewood, Md.; associate pathologist at St. John's Long Island City Hospital from 1929 to 1938, when he became director of laboratory; director of laboratory at Rockaway Beach (N. Y.) Hospital, Flushing (N. Y.) Hospital and Dispensary, and the Boulevard Hospital in Long Island City; consultant pathologist, Jamaica (N. Y.) Hospital and River Crest Sanitarium in Long Island City; died April 14, aged 51.

Carpenter, Dudley Newcomb ⊕ Captain, U. S. Navy, retired, Washington, D. C.; born in Kittery, Maine, June 28, 1874; Harvard Medical School, Boston, 1896; entered the Navy in 1897, serving at the Battle of Manila Bay, and with the U. S. Army in the First Advance Philippine Insurrection; was at Vera Cruz in 1914 and, during World War I, established and commanded the U. S. Naval Hospital at Queenstown, Ireland, for which he was awarded the Navy Cross; commanded hospitals at the Puget Sound Naval Shipyard, Bremerton, at Pearl Harbor, T. H., and at San Diego, Calif.; served as surgeon aboard cruisers and battleships; also had tours at the U. S. Naval Academy, Annapolis, Md., and in the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.; in 1927 member of the House of Delegates of the American Medical Association; fellow of the American College of Surgeons; member of the council of the Association of Military Surgeons of the United States; appointed a delegate to the seventh International Medical Congress in Madrid; promoted to captain in the medical corps of the U. S. Navy on Feb. 1, 1918; placed on the retired list of officers of the Navy on Dec. 1, 1933; recalled to active duty in June, 1943, after 10 years of retirement, serving on the Naval Examining and Retirement Board from 1943 to 1946; released again to inactive duty in November, 1945; died in the Naval Hospital, Bremerton, Wash., March 26, aged 80, of arteriosclerotic heart disease.

Parker, Walter Robert ⊕ Detroit; born in Marine City, Mich., Oct. 10, 1865; University of Pennsylvania Department of Medicine, Philadelphia, 1891; professor of ophthalmology at the University of Michigan Medical School in Ann Arbor from 1905 to 1933, when he became professor emeritus of ophthalmology; in 1937 a scholarship was established at the school in his honor; specialist certified by the American Board of Ophthalmology; in 1915 member of the House of Delegates of the American Medical Association, serving as chairman of the Section on Ophthalmology in the same year, and, in 1916, was awarded the Knapp Medal of that section for research on "The Relation of Tension of Eyeball to Papilledema"; member of the American Academy of Ophthalmology and Otolaryngology, of which he was president in 1922, American Ophthalmological Society, of which he was president in 1928, and the Association for Research in Ophthalmology; honorary president of the Detroit Ophthalmology Society; fellow of the American College of Surgeons; veteran of the Spanish-American War and World War I; on the staffs of the Woman's, Harper, and Florence Crittenton hospitals in Detroit and Cottage Hospital in Grosse Pointe, Mich.; in 1935 the honorary degree of doctor of science was conferred on him by the University of Michigan; died at his home in Grosse Pointe, Mich., April 1, aged 89, of paralysis agitans.

Strauss, Israel ⊕ New York City; born in 1873; Columbia University College of Physicians and Surgeons, New York City, 1898; for many years on the faculty of Cornell University Medical College; an associate member of the American Medical Association; member and past president of the American Neurological Association and the Association for Research in Nervous and Mental Diseases; member of the New York Academy of Medicine and the American Psychiatric Association; served as vice-president of the Dazian Foundation for Medical Research; first president of the Society of Hillside Hospital; on the staffs of the Maimonides Hospital in Brooklyn, and Morrisania, Montefiore, and Mount Sinai hospitals; died April 4, aged 81, of cerebral hemorrhage.

Grant, James Edward ⊕ Northville, N. Y.; born in Westville March 31, 1873; Columbia University College of Physicians and Surgeons, New York, 1900; an associate member of the American Medical Association; for two terms mayor of Northville; past president of the Fulton County Tuberculosis and Health Association; member of the New York State Health Officers Association, American Public Health Association, New York State Association of School Physicians, and American School Health Association; health officer of the towns of Northampton, Edinburg, Benson, and Hope and also of the village of Northville; on the staff of the Nathan Littauer Hospital in Gloversville; died March 13, aged 81, of arteriosclerosis and pneumonia.

Rice, Lee Roy ⊕ Diboll, Texas; born in Sanger, June 15, 1905; Baylor University College of Medicine, Dallas, 1930; past president of the Cooke County Medical Society; interned at the Touro Infirmary in New Orleans, where he was later a resident physician; interned at St. Margaret's Hospital in Montgomery, Ala.; served during World War II; formerly health officer of Gainesville, where he was on the staff of the Gainesville Sanitarium; at various times urologist for the Texas and Pacific Hospital and on the staff of Kahn Memorial Hospital in Marshall, and Memorial Hospital at Lufkin; died Dec. 28, 1954, aged 49, of coronary disease.

Richardson, Frank Lloyd ⊕ Vancouver, Wash.; born in Exira, Iowa, Aug. 11, 1905; University of Minnesota Medical School, Minneapolis, 1937; specialist certified by the American Board of Internal Medicine; served during World War II in the Philippine Islands and was one of the few survivors of the Death March at the surrender of Bataan; imprisoned in Japan until September, 1945; awarded the Silver Star for duty at Bataan; served on the staffs of the Veterans Administration in Vancouver and the Veterans Administration Hospital in Portland, Ore., where he died Jan. 19, aged 49, of malignant lymphoma.

Koenig, Carl Frederick ⊕ Philadelphia; born in Philadelphia Feb. 13, 1893; Temple University School of Medicine, Philadelphia, 1914; specialist certified by the American Board of Radiology; member of the American College of Radiology; served with the 77th division during World War I; held the Purple Heart and the Distinguished Service Cross, and was cited for bravery by General Pershing; chief radiologist at Stetson Hospital; associated with the Shriners Hospital for Crippled Children; died in the Temple University Hospital Jan. 27, aged 61, of carcinoma of the esophagus.

⊕ Indicates Member of the American Medical Association.

Albright, Fred Clayton ✠ Garland, Kan.; University Medical College of Kansas City, Mo., 1910; died March 15, aged 76, of heart disease.

Allen, Herbert Coleman ✠ Yarnell, Ariz.; New York Homeopathic Medical College and Hospital, New York City, 1896; an associate member of the American Medical Association; fellow of the American College of Surgeons; member of the Medical Society of the State of New York; formerly practiced in Brooklyn, where he was on the staff of the Carson C. Peck Memorial Hospital and consultant at the Brooklyn Nursery and Infants Hospital; died in Phoenix, Ariz., Jan. 5, aged 79, of cancer.

Anderson, Herbert Wallace ✠ Ukiah, Calif.; State University of Iowa College of Medicine, Iowa City, 1936; died March 22, aged 44, of cancer.

Barteau, Fred B., Spokane, Wash.; University of Pennsylvania Department of Medicine, Philadelphia, 1908; formerly associated with the Indian Service; died in Springville, Utah, March 7, aged 74, of coronary occlusion.

Beede, Arthur Huntington ✠ Walnut Creek, Calif.; Stanford University School of Medicine, San Francisco, 1926; on the staff of the Providence Hospital in Oakland; died April 14, aged 57.

Benoit, Frank Tancrede ✠ Winona, Minn.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1905; died in the Winona General Hospital Feb. 7, aged 73, of carcinoma of the prostate.

Bierman, Max John ✠ St. Louis; Washington University School of Medicine, St. Louis, 1923; died in the Faith Hospital Feb. 19, aged 57, of uremia.

Bizzarri, Ubaldo Louis, New York City; Regia Università di Napoli Facoltà di Medicina e Chirurgia, Italy, 1927; specialist certified by the American Board of Pediatrics; member of the Medical Society of the State of New York; assistant clinical professor of pediatrics at the New York Medical College, Flower and Fifth Avenue Hospitals; associated with the Sea View Hospital, Staten Island, Metropolitan, Flower and Fifth Avenue, and Welfare hospitals; attending pediatrician at the Mother Cabrini Memorial Hospital; died April 4, aged 52, of cancer.

Bonner, James T., Mount Sterling, Ky.; Louisville National Medical College, Medical Department State University, Louisville, 1905; died Jan. 3, aged 81, of senility.

Brashuer, William Edward ✠ Robstown, Texas; University of Arkansas School of Medicine, Little Rock, 1929; served in France during World War I; for many years city health officer; since 1931 local surgeon for the Missouri Pacific Railroad Company and for the past two years surgeon for the Texas Mexico Railroad Company; on the staffs of Spohn, Memorial, and Driscoll Foundation Children's hospitals in Corpus Christi, and the Robstown Hospital; died Jan. 3, aged 56, of coronary occlusion.

Garmany, James F. ✠ Mineral Wells, Texas; St. Louis University School of Medicine, 1906; formerly practiced in Portales, N. Mex., where he was president for two terms of the Roosevelt and Curry Counties medical Society and for many years health officer; served during World War I; died Feb. 6, aged 77, of arteriosclerosis.

Graf, William Joseph ✠ Cincinnati; Medical Department of the University of Cincinnati, 1910; past president of the Academy of Medicine of Cincinnati and the Public Health Federation of Cincinnati; associated with the Bethesda Hospital; served during World War I; at one time bacteriologist for the city milk commission; died March 27, aged 71, of cerebral hemorrhage.

Levin, Samuel Fillmore, Philadelphia; Medico-Chirurgical College of Philadelphia, 1910; died in the Deborah Tuberculosis Sanatorium in Browns Mills, N. J., Jan. 19, aged 73, of tuberculosis.

Lindsey, Lucien Nelson ✠ Forsyth, Ill.; St. Louis College of Physicians and Surgeons, 1905; served in France during World War I; on the staffs of the St. Mary's and the Decatur and Macon County hospitals in Decatur; died April 7, aged 77, of heart disease.

McConaghy, Thomas P. ✠ Camden, N. J.; Temple University School of Medicine, Philadelphia, 1925; died in the Hahnemann Hospital March 18, aged 61.

McDaniel, Joseph Columbus ✠ York, Ala.; Medical College of Alabama, Mobile, 1904; died March 11, aged 82, of senility.

McNally, David Albin, Springfield, Mass.; McGill University Faculty of Medicine, Montreal, Canada, 1899; served during World War I; for many years practiced in Biddeford, Maine, where he was a member of the board of health; died March 12, aged 86, of coronary occlusion.

Makar, Ignatius Edward ✠ Chicago; Loyola University School of Medicine, Chicago, 1919; served during World War I; died in the Roseland Community Hospital April 16, aged 59, of acute hemorrhagic pancreatitis.

Masters, W. Eugene ✠ Columbus, Ohio; Ohio State University College of Medicine, Columbus, 1917; during World War I a transport surgeon; served during World War II; at one time on the faculty of his alma mater; on the staff of the White Cross Hospital, where he died March 17, aged 60.

Miller, John Estill ✠ Quincy, Ill.; Baltimore Medical College, 1893; member of the courtesy medical staff of Blessing Hospital, where he died April 5, aged 83, of bronchogenic carcinoma.

Mohan, Bernard Augustine, Buffalo; University of Buffalo School of Medicine, 1922; member of the Medical Society of the State of New York; formerly on the staff of the Mercy Hospital, where he died March 10, aged 58, of gangrene of the left foot and diabetes mellitus.

Morgan, Ruth Bennett, Packanack Lake, N. J.; Johns Hopkins University School of Medicine, Baltimore, 1904; for 37 years a missionary in China; died in Paterson (N. J.) General Hospital March 10, aged 77, of aneurysm of the right cerebral artery.

Murphy, John Charles ✠ Ridgway, Ill.; St. Louis University School of Medicine, 1905; past president of the Gallatin County Medical Association; veteran of World War I; served as a member of the village council, high school and grade school board; died March 12, aged 78, of uremia.

Narins, William, New York City; Columbia University College of Physicians and Surgeons, New York City, 1905; member of the Medical Society of the State of New York; died in Mount Sinai Hospital April 7, aged 75, of carcinoma of the bladder.

Nauman, John Henry ✠ Martins Ferry, Ohio; State University of Iowa College of Medicine, Iowa City, 1927; served during World War II; on the staff of the Martins Ferry Hospital; died March 25, aged 51, of brain tumor.

Netherton, Frederick Fulton, Long Beach, Calif.; the Hahnemann Medical College and Hospital, Chicago, 1891; served during World War I; died March 13, aged 87, of malignant tumor of the sigmoid colon.

Newman, William Thomas, Mobile, Ala.; Memphis (Tenn.) Hospital Medical College, 1903; died Feb. 18, aged 81, of carcinoma of the prostate.

Nixon, Samuel Henry, Christiansburg, Va.; Medical College of Virginia, Richmond, 1920; member of the Medical Society of Virginia; served a three year fellowship at Mayo Clinic in Rochester, Minn.; a member of the county school electoral board; died March 11, aged 61, of a cerebral hemorrhage.

Norman, Olin Bertram ✠ Indianapolis; Western Reserve University Medical Department, Cleveland, 1909; served with the Engineer Corps during World War I; died in St. Vincent's Hospital Jan. 15, aged 73, of coronary occlusion.

Noyes, Hilda Herrick, Oneida, N. Y.; Syracuse University College of Medicine, 1901; died Feb. 15, aged 77, of acute coronary occlusion.

Paradise, Frederick Alton, Oak Park, Ill.; Loyola University School of Medicine, Chicago, 1931; formerly on staff of Bethany Sanitarium and Hospital, Chicago; died April 11, aged 65.

Pretlow, Robert Henley ✠ Suffolk, Va.; University of the City of New York Medical Department, New York City, 1894; died in the Louise Obici Memorial Hospital March 12, aged 84, of cerebral hemorrhage and arteriosclerosis.

Pritchard, Clarence David, Russellville, Ala.; University of Tennessee College of Medicine, Memphis, 1935; interned at the Baptist Memorial Hospital in Memphis, Tenn.; member of the American Academy of General Practice; served during World War II; part owner of the Franklin County Hospital and Clinic; died March 8, aged 43, of astrocytoma of the right frontal and temporal lobes of the brain.

Pryor, Robert Benajor ✠ Selma, Ala.; Medical Department of Tulane University of Louisiana, New Orleans, 1905; formerly associated with the Indian Service; died in the Selma Baptist Hospital Jan. 10, aged 75, of cerebral hemorrhage.

Rairdon, Clarence Wilber, Santa Ana, Calif.; University Medical College of Kansas City, Mo., 1889; died Jan. 1, aged 92, of arteriosclerotic heart disease.

Ranson, Briscoe Baldwin Jr. ✠ East Orange, N. J.; University of Maryland School of Medicine, Baltimore, 1902; an associate member of the American Medical Association; fellow of the American College of Surgeons; past president of the Society of Surgeons of New Jersey; served on the staff of the Orange (N. J.) Memorial Hospital, where he died March 25, aged 77, of coronary thrombosis.

Reed, Laurence Bradford ✠ Plymouth, Mass.; Harvard Medical School, Boston, 1907; formerly on the staff of the Jordan Hospital; president of the Plymouth Savings Bank; died March 24, aged 74, of heart disease.

Running, Darrell Hamilton ✠ Tacoma, Wash.; University of Toronto Faculty of Medicine, Toronto, Canada, 1922; served during World War II; on the staff of the Pierce County Hospital, Tacoma General Hospital, and St. Joseph's Hospital, where he died March 29, aged 56, of cerebral vascular accident.

Schlivek, Kaufman ✠ New York City; Columbia University College of Physicians and Surgeons, New York City, 1904; formerly clinical professor of ophthalmology at his alma mater; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; consultant at St. Joseph Hospital in Far Rockaway, Mount Sinai Hospital, and the New York Eye and Ear Infirmary; died March 31, aged 74, of heart disease.

Schulze, William ✠ Hagerstown, Md.; George Washington University School of Medicine, Washington, D. C., 1904; an associate member of the American Medical Association; for many years medical examiner for the Western Maryland Railway; died March 14, aged 79, of pulmonary tuberculosis.

Scott, Ida May, Pittsburgh; Cleveland Homeopathic Medical College, 1901; died Jan. 17, aged 81, of carcinomatosis.

Seibert, William Erdman, Lancaster, Pa.; Jefferson Medical College, Philadelphia, 1917; served during World War I; formerly practiced in Greencastle, where he was a director of the First National Bank; died in the Lancaster General Hospital March 23, aged 61.

Sellers, Ira Jackson ✠ Birmingham, Ala.; Vanderbilt University School of Medicine, Nashville, Tenn., 1897; died March 11, aged 82, of carcinoma of the liver.

Sette, Alfred Joseph ✠ Stamford, Conn.; George Washington University School of Medicine, Washington, D. C., 1927; fellow of the International College of Surgeons; served in the U. S. Naval Reserve during World War II; on the staff of St. Joseph Hospital; senior attending surgeon at the Stamford Hospital, where he was medical director of clinics, and where he died March 12, aged 54, of acute myeloblastic leukemia.

Shealy, Festus Killian, Clinton, S. C.; Medical College of the State of South Carolina, Charleston, 1912; member of the South Carolina Medical Association; past president of the Laurens County Medical Society; died Feb. 10, aged 69, of carcinoma of the prostate.

Stefano, James Joseph ✠ Baldwin, N. Y.; Long Island College Hospital, Brooklyn, 1915; member of the National Gastroenterological Association; associated with the Brooklyn (N. Y.) Hospital; died March 25, aged 61, of cerebral hemorrhage.

Striegel, Bernard Francis, St. Louis; St. Louis University School of Medicine, 1918; member of the Missouri State Medical Association; physician for the Union Electric Company for 36 years; died in DePaul Hospital March 17, aged 67, of mesenteric thrombosis.

Tillson, Edwin Mortimer ✠ Milwaukee; College of Physicians and Surgeons of Chicago, 1895; served as school physician; died in Miami, Fla., March 3, aged 82, of uremia and pyonephrosis.

Train, John Kirk, Savannah, Ga.; born in Savannah, Feb. 12, 1880; University of Virginia Department of Medicine, Charlottesville, 1899; University and Bellevue Hospital Medical College, New York City, 1900; past president of the Georgia Medical Society; honorary president of the University of Virginia Alumni Association, serving as its president several times; on the staffs of the Central of Georgia Railway Hospital, Telfair Hospital, Georgia Infirmary, Charity Hospital, and St. Joseph's Hospital; died March 15, aged 75, of myocardial failure.

Venable, Sidney Carrington ✠ Tulsa, Okla.; University of Texas School of Medicine, Galveston, 1915; member of the American Society of Clinical Pathologists; served during World War I; at one time assistant superintendent of the Cleveland City Hospital; died in Veterans Administration Hospital, Topeka, Kan., March 28, aged 64, of coronary thrombosis.

Wait, Harold Nathan ✠ Iowa City, Iowa; University of Pennsylvania Department of Medicine, Philadelphia, 1907; member of the Illinois State Medical Society and the Radiological Society of North America; died March 26, aged 69, of cerebral hemorrhage.

Waldman, Joseph Sterling ✠ Belleville, Ill.; St. Louis University School of Medicine, 1914; on the staff of St. Elizabeth's Hospital; died March 29, aged 69, of mesenteric thrombosis.

Warner, Richard Ambrose ✠ Commodore, U. S. Navy, retired, Washington, D. C.; Georgetown University School of Medicine, Washington, D. C., 1901; fellow of the American College of Surgeons; entered the U. S. Navy on May 18, 1905, and retired Aug. 1, 1942; died in the U. S. Naval Hospital, Bethesda, Md., Jan. 6, aged 76, of a lung tumor.

Willard, William P., San Francisco; Medical Department of the University of California, San Francisco, 1899; member of the American Association of Genito-Urinary Surgeons and the American Urological Association; died April 6, aged 78.

Williams, Francis ✠ San Francisco; College of Physicians and Surgeons of San Francisco, 1900; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; died in Los Altos Jan. 11, aged 83, of carcinoma of the prostate.

Wiser, Frank Clayton, Los Angeles; Rush Medical College, Chicago, 1891; died Feb. 3, aged 85, of arteriosclerotic heart disease with hypertension and benign prostatic hypertrophy.

Witherspoon, Charles Russell ✠ Rochester, N. Y.; University of Pennsylvania Department of Medicine, Philadelphia, 1898; in 1947 was honored with a special citation, and a life membership was conferred on him by the Rochester Academy of Medicine; since 1928 on the board of the Rochester State Hospital, where he was president since 1947; for many years on the staff of the Rochester General Hospital; died March 27, aged 82, of arteriosclerotic heart disease.

Woodhull, Royden Ashwell ✠ Chula Vista, Calif.; Detroit College of Medicine and Surgery, 1914; on the staffs of the Chula Vista Hospital and the Paradise Valley Sanitarium and Hospital in National City, where he died March 26, aged 66, of cardiac disease and glomerular nephritis.

Young, Howard Osbon ✠ Spokane, Wash.; Bennett Medical College, Chicago, 1912; member of the American Academy of General Practice; died in St. Luke's Hospital Feb. 22, aged 70, of myocardial infarction, coronary occlusion, and arteriosclerosis.

FOREIGN LETTERS

AUSTRIA

Relationship of Eosinophilic Granuloma to Letterer-Siwe's Disease.—At the meeting of the Society of Physicians in Vienna on Dec. 10, 1954, Dr. L. Kuscko reported biopsy and autopsy findings in a 15-year-old boy. A focus of destruction of the bone above the left eye had occurred in the patient when he was 10 years old. Biopsy of the lesion revealed eosinophilic granuloma. Diabetes insipidus and infiltration at the left side of the neck developed at the age of 13 years. A second biopsy also revealed eosinophilic granuloma. There was rapid deterioration of the patient's general condition. Death resulted from bilateral recurrent spontaneous pneumothorax in the presence of bilateral "honeycomb lung." An adherent reticulohistiocytary granuloma at the junction between neurohypophysis and adenohypophysis was observed at autopsy as the morphological substrate for diabetes insipidus. In addition there were granulomas of the Letterer-Siwe type with varied contents of eosinophilic and foam cells in the cervical and mediastinal lymph nodes and in the thymus. The lungs showed the aspect of the "honeycomb lung" with extensive reticulohistiocytary proliferation and with much participation of foam cells, which were storing anisotropic and isotropic lipoids. The same observations were made on small hepatic foci. The spleen and bones were normal. The pathologist considered this a case of reticulohistiocytosis of the Letterer-Siwe disease type, showing in its early stage distinct similarities to the eosinophilic granuloma of bone (Jaffé-Lichtenstein's disease).

Analysis of 12,000 Thyroidectomies.—At the same meeting Dr. P. Huber analyzed the results of 12,371 thyroidectomies performed between 1945 to 1953. Indications for operation remained essentially unchanged in that period; thyreostatic substances, and radioactive iodine so far have caused only slight shifting in the indications. There was an increased incidence of thyrotoxicosis. The average preoperative preparatory period has become longer. Preliminary examinations comprise as a rule a roentgenologic examination of the organs of the neck and thorax, a laryngoscopic examination, and a general physical examination. Thyroid function tests are done only for specific indications since the clinical aspect of thyrotoxicosis offers sufficiently reliable information for the selection of the time of operation. Since 1947 no postoperative crisis occurred in the 688 patients in this series with diffuse toxic goiter. The operative mortality after primary intervention for benign goiter was 0.36%, after operation for recurrent benign goiter was 0.7%, and after radical operation for malignant goiter was 1.8%. The risk increases with advancing age, but the death rate was only 2.3% even in patients over 70 years of age.

Disturbance of wound healing and permanent fistulas have become rare since Pehafil, a completely synthetic unabsorbable polyamide suture material, has been used exclusively. The number of postoperative lesions of the recurrent laryngeal nerve after primary surgical intervention was gradually reduced from 5.3 to 3.2% (2.6% with exclusion of functional paresis of the recurrent laryngeal nerve). It remained unchanged (17%) after surgical interventions for recurrences. It is possible to avoid bilateral injuries to the recurrent laryngeal nerve in surgical intervention for relapses. The process achieved in laryngology in combating postoperative stenosis of the larynx by dilative intervention on the glottis has been a great boon to patients. To improve the operative results a diagnostic excision of enlarged cervical lymph nodes that do not disappear within a short time after physical therapy should always be made. The speaker cautioned against extending the indications for thyroidectomy for the purpose of preventing carcinoma, since total extirpation of the thyroid is not possible, and malignant recurrences in the remainder of the thyroid gland were repeatedly observed. Papillary adenocarcinoma occurring in young patients has a permanent favorable prognosis. Struma lymphomatosa is interpreted as a stage of exhaustion after thyrotoxicosis; thyroidectomy for goiters of this type usually is followed by myxedema. Severer forms of myxedema are rare after thyroidectomies for other types of goiter.

Therapeutic Use of Placental Extract.—At the meeting of the Society of Physicians in Vienna on Dec. 17, 1954, Dr. F. Brauner reported on the treatment of 140 patients with a pure extract of placenta. This treatment benefits patients with x-ray burns, varicose ulcers of the leg, neurodermatitis, scleroderma, and sclerodactylia, kraurosis vulvae, and migraine. An accessory favorable action on diseases of the joints was observed. Although psoriasis, idiopathic atrophy of the skin, and alopecia did not respond to the treatment, none of the patients who did not respond to the therapy became worse. Thus this method of treatment is completely innocuous and may be carried out in ambulant patients without any difficulty.

DENMARK

Treatment of Manic Psychoses.—The observation in 1949 by Cade that guinea pigs became lethargic on the injection of lithium prompted the staff of the mental hospital in Aarhus to give it to 48 patients in the manic stage of manic-depressive psychosis. These tests are reported on in *Ugeskrift for læger* for Jan. 27, 1955, by Schou and his co-workers. Tablets of lithium carbonate and lithium citrate, in a dose of 0.3 gm. of the former salt per tablet, were issued by the hospital's laboratory together with placebo tablets in such a way that neither the patients nor the hospital staff knew which was which at a given time. The patients' reactions were controlled in respect to their hemoglobin concentration, sedimentation rate, leukocyte count, sugar and protein content of the urine, electrocardiograms, and the lithium content of the spinal fluid. There were 18 patients whose improvement under this treatment was such that it could hardly be attributed to any spontaneous variation in the disease. In 21 others the improvement might conceivably have coincided with such a spontaneous variation. There remained nine patients whose mania did not respond to this treatment. When the lithium was pushed beyond a certain tolerance, nausea and vomiting, diarrhea, general fatigue, slight drowsiness, and shakiness of the hands followed but passed when the lithium was withheld. The therapeutic value of this treatment is diminished by the risk of poisoning, which requires careful clinical and biochemical control. Because lithium does not act as quickly as electroshock, it cannot be expected to replace the latter treatment.

Antibiotic Treatment of Whooping Cough.—The epidemic of whooping cough in 1951 and 1952 in Denmark afforded the Blegdam Fever Hospital an exceptional opportunity for studying the reactions of this disease to antibiotics. The sulfonamides and penicillin have little effect on whooping cough itself, however useful they may be in combating its complications. The application of streptomycin to whooping cough was short-lived partly because of the alarming toxicity of this antibiotic and partly because chloramphenicol seemed to outclass it. Between March 1, 1950, and July 1, 1952, a total of 1,017 patients with whooping cough were treated at this hospital, and many of them were the subject of special investigations on which Dr. Anker Christensen has reported in the *Journal of the Danish Medical Association* for Feb. 10, 1955. Over 500 of the patients were treated with chloramphenicol, children being given the drug by mouth in doses of 100 mg. per kilogram of body weight daily in four or five doses. Oxytetracycline was given to 95 patients, and, as these two antibiotics had about the same effect in certain respects, space can be saved by referring only to the results with chloramphenicol. To assure impartial judgment, arrangements were made so that 40 of 82 children between the ages of 1 and 3 years received chloramphenicol and the rest received only

The items in these letters are contributed by regular correspondents in the various foreign countries.

general hospital treatment. The two groups were compared with respect to (1) the frequency of the bouts of coughing, (2) their character, (3) the patients' general condition, and (4) the outcome of bacteriological cultures. The frequency of the bouts of coughing showed a statistically significant difference in favor of the patients treated with chloramphenicol. The severity of these bouts was also reduced, and improvement in the patients' general condition was more rapid among the treated patients, who also yielded negative cultures earlier than the controls. Although chloramphenicol had a beneficial effect, it appeared to reduce the severity rather than the number of the bouts of coughing. When the drug is not pushed effectively, it may even prolong the period during which cultures are positive. Not only administration of a too timid dosage of the drug but also failure to insure isolation of the patient may render the treatment disappointing. Another shortcoming of treatment with antibiotics seems to be the subsequent diminution of the natural immunity of children to whooping cough, which is shown by the relatively impaired complement fixation reactions of children treated with chloramphenicol.

Restoration of the Rigshospital.—More than 10 years ago it became clear that the Rigshospital in Copenhagen would have to be rebuilt or restored and enlarged if it were to meet all the requirements now considered essential for the running of a modern hospital. It was ultimately decided that the old site should be retained. A competition among hospital architects for an ideal plan was arranged. Competitors were advised to remember that work would have to be carried on in various old hospital departments while new departments were being created. The 28 competitors represented Finland, Norway, Sweden, and Denmark. The first prize went to a firm of architects in Odense and the second to a firm that included engineers as well as architects. Five other plans were also bought by the committee, as they contained ideas that might possibly be incorporated in the final scheme.

ENGLAND

General Practitioner Research.—In Research Newsletter No. 5 of the College of General Practitioners (*Practitioner* **174:**199, 1955) details are given of the morbidity survey that is about to be undertaken by the college in conjunction with the registrar general's department. Over 100 practitioners have volunteered to participate in the survey, which will be the first of its kind to be carried out on this scale. It is hoped that the college will be able to present figures for morbidity of a much greater degree of accuracy than have ever before been obtained. It is also announced that the help of the college has been requested in an investigation by the Research Council into marriage and human relationships, which seeks to determine how far attitudes toward marriage, the home, and the family may be responsible for reality falling short of anticipation in the marriage relationship.

In the same Newsletter, Dr. D. G. French gives some details of the common findings in the preicteric stage of infectious hepatitis observed during an epidemic in children. During the prodromal stage, which lasted about a week, the children were "out of sorts" and anorexia was marked. Many of them were brought to the physician's office for a "tonic to make them eat." Vomiting was frequent in this stage among those who subsequently became jaundiced, but this caused no alarm among the parents, who allowed the vomiting to persist for several days before seeking medical aid. The explanation for this is that the children usually felt much better after vomiting, and there was no severe abdominal pain. Of 17 closely observed patients who became jaundiced, the liver was palpable in five and the spleen in seven in the prodromal stage. In no case did they become palpable for the first time after jaundice appeared. Blood coagulation times were of no diagnostic significance. Leukocyte counts and the ratio of polymorphonuclear cells to lymphocytes were usually normal. The usual textbook description of leukopenia with relative lymphocytosis was not observed. Dr. French concludes that the most important factor in the preicteric diagnosis of infectious hepatitis is to have the condition in mind.

Student Health Service.—In his annual report for the academic year, 1953-1954, Dr. Wilson Johnston, the medical officer to the Queen's University of Belfast, reports that in only 165 of the 505 students joining the university were no defects found. The incidence of defects was 91.5 per 100 students (many students had multiple defects). Among the men the three commonest groups of defects were dermatological, medical, and ocular; among the women the three most common were dermatological, orthopedic, and ocular. Roentgenograms were taken of all the new students, and these revealed four students with active pulmonary tuberculosis and 13 with inactive tuberculosis. Included in his report is a survey of the Mantoux testing and BCG vaccination in 10 universities from October, 1949, to June, 1954. Of the 11,065 students and nurses tested, 27.6% showed negative reactions. The most striking difference was between the 1,289 nurses recruited from the industrial area of Yorkshire to train in the Sheffield hospitals, among whom the incidence of negative reactors was only 21.8%, and the 462 girls who came from the rural northeast of Scotland to train at the Aberdeen Royal Infirmary and whose percentage of negative reactors was 43.5. A comparable difference was found among the women students in these two centers. No untoward reactions were recorded among the 2,630 students and student nurses who underwent BCG vaccination during this period; 19 students failed to convert to a positive Mantoux reaction on first vaccination, but all but three were converted on subsequent vaccination, and it is therefore assumed that in these the failure was due to faulty technique. Thirty-eight students are recorded as having reverted to negative at the subsequent annual testing, but 30 of these occurred in Edinburgh, where 92 students were given BCG vaccine from the Pasteur Institute, Paris, France. Despite the fact that double the recommended dose was given, about 40% required revaccination with Danish vaccine. Two cases of pulmonary tuberculosis occurred among the vaccinated students. Of the 392 students and student nurses in the series, who were initially tuberculin negative and who did not receive BCG vaccine, tuberculosis subsequently developed in 14.

Cancer of the Larynx and Bronchi.—Dr. James Maxwell has analyzed the incidence of carcinoma of the larynx over the last 10 years in England and Wales (*Lancet* **1:**193, 1955). Although the incidence of deaths from malignant disease has risen from 73,564 in 1943 to 87,642 in 1952, the deaths from cancer of the larynx have fallen from 1,027 to 941 in the same period. This means that the proportion of laryngeal cancer to the cancer total has fallen from 1.39% to 1.08%, which is even lower than that in 1911 (1.29%). Dr. Maxwell contrasts these figures with the increasing incidence of bronchogenic carcinoma, and asks whether the inhalation of carcinogens (cigaret smoke) is really an important factor in the production of bronchial cancer in view of this diminution. If tobacco smoke, or any other inhaled irritant, causes malignant change in the bronchial epithelium, the relative freedom of the larynx can be explained only by assuming that its mucosa is much less sensitive to the inhaled agent than that of the bronchi. On the other hand our knowledge of the action of most carcinogens indicates that they act strongly on squamous epithelium. As there has not been a comparable increase in the incidence of carcinoma of the larynx, Dr. Maxwell concludes that whether or not tobacco smoke is a factor in the production of bronchial carcinoma, some hidden and hitherto unsuspected factor is responsible for the increase in cancer of the lung.

Medical Control of Professional Boxing.—According to Dr. J. W. Graham (*Brit. M. J.* **1:**219, 1955), since the war there have been five fatal accidents to professional boxers at licensed fights. In each case death was due to hemorrhage from cerebral cortical veins. No fractured skull has been reported. It was concluded that in most cases death is due, not to the blow, but to the boxer striking the back of his head on the ring floor. It has therefore been recommended by the medical subcommittee that a special type of ring flooring developed by Cornell University should be tried out in this country. As a result of recommendations of the subcommittee, managers, seconds, and others are now instructed in the first-aid treatment of the unconscious boxer. Ear rubbing, strong smelling salts, and any form of stimulation are expressly forbidden. It is now an offense for anyone to use anything but

epinephrine as a hemostatic. If epinephrine solution does not control the bleeding, the contest is either abandoned by the manager or stopped by the referee. No form of stimulant, either real or imaginary, is allowed by the board of control, except cold water sprinkled on the body or used as a mouth wash. Because of the risk of brain or kidney trauma, blows with any part of the fist to the back of the head, or to the region of the kidney, are now deemed fouls. Although serious eye injuries are rare, visual standards have been fixed to prevent a person with myopia being licensed to fight, in order to reduce the risk of a detached retina. To diminish the risk of permanent brain injury, referees are instructed that they must not allow a boxer to take unnecessary punishment, and in no circumstances must they allow a defenseless boxer to be struck. During 1954, in implementing this instruction, 360 contests out of 1,973 were stopped by the referee before a knockout or the end of the contest had occurred. One curious result of this is that the spectators at any fight now protest vociferously if the referee in their opinion does not stop the contest soon enough.

Edinburgh Medical Journal Ceases Publication.—One of the oldest existing medical journals, the *Edinburgh Medical Journal*, has ceased publication after 150 years of continuous publication. In the final issue (December, 1954) the directors describe it as "a geriatric casualty of the changed conditions in which we live." The circulation of the journal had not increased sufficiently to counter rising costs of production, and "advertisers seem to be concentrating more and more on postal communications." The history of the journal dates back to the beginnings of medical journalism in Edinburgh when *Medical Essays and Observations* ran from 1733 to 1744. This was followed by *Essays and Observations, Physical and Literary* (1745 to 1765), *Medical and Philosophical Commentaries* (1773 to 1795), and *Annals of Medicine* (1796 to 1804). In 1805 this became the *Edinburgh Medical and Surgical Journal*. In 1855, the words "and Surgical" were dropped from the title.

PERU

Symposium on Trauma.—At the Third Interamerican Meeting of the American College of Surgeons held in Lima in January, Dr. Kehl Markley, of the United States Public Health Service, reported on the clinical appraisal of saline therapy in shock due to burns. He divided a series of 110 children and 83 adults, all of whom suffered burns of more than 10% of the body surface, in two groups. One group was given the usual colloid therapy and the other was given saline solution chiefly by mouth in an amount equivalent to 15% of the body weight within the first 24 hours after the injury. Half of this amount was given in the next 24 hours. The saline solution contained sodium, chloride, and bicarbonate ions in physiological concentrations. The mortality rate in both groups, in the first 48 hours, was nearly the same, and saline therapy was as effective as colloid in combating shock through this period. On the other hand, the saline-treated group showed water, sodium, and chloride retention and potassium loss as compared with the colloid-treated group. The saline-treated patients had less hemoconcentration than those treated with colloids. The speaker concluded that a combination of the two treatments should be investigated.

Dr. Gilberto Morey, director of the Children's Hospital of Lima, discussed the treatment of burns in children. In the period 1940 to 1954 he treated 7,999 patients of whom 1,860 were hospitalized and 331 died, giving a mortality rate of 17%. Shock must be treated by every known means. Barbiturates and opiates are used to relieve the pain. The speaker preferred an open method of treatment in which he applied a combination of prontosil rubrum, percaine, penicillin, and peptide to the burned area. He noted a progressive anemia that becomes evident on the fifth day after injury and that requires blood transfusions.

Drs. Herbert Conway and R. B. Stark of New York classified burns as superficial, first and second degree, or deep (third and fourth degree). Control of body fluids, proteins, and electrolytes has resulted in an increasing number of reports in which patients with superficial burns involving 60 or 70% of the body surface have survived. Such patients pose a problem in surface coverage so that now the plastic surgeon is an important member of the burn team. The first step in the management of patients with deep burns is the emergency care. A sterile dressing with fine mesh gauze should be applied to the burned surface immediately. The patient should receive antibiotic therapy early and a dose of tetanus antitoxin or of a booster dose of toxoid. Pain should be controlled by the intravenous administration of morphine; if the patient is in shock, morphine given by any other route will not be so promptly effective because of peripheral vasoconstriction. Repeated intramuscular injections of morphine, though effective while the patient is in shock, may result in overdosage as the patient recovers from shock. If large amounts of intravenous fluids are needed a cannula should be tied into a vein of the arm, so that the clinician is equipped to observe accurately and to control effectively any abnormal fluid balance. As soon as shock is controlled excision of the burned tissue followed by free split thickness grafts is the therapy of choice for certain burned areas. This method of management has the advantages that infection is avoided, the period of morbidity is diminished, and such complications as contracture are prevented. Patients so treated are often returned to useful activity within three or four weeks. This method cannot be used for burns that are very deep. In these when the slough cannot be excised primarily, its separation should be hastened by chemical débridement with pyruvic acid.

Dr. Paul Samson, Oakland, Calif., said that in the emergency care of serious chest injuries the main aims are (1) to relieve the pain preferably with intercostal nerve block, (2) to support the cardiorespiratory function, and (3) to replace fluids. This must not be done too rapidly since an acute pulmonary edema may result. Dr. Ignacio González of Concepción, Chile, also speaking of chest injuries said that specialized care was essential because the treatment is usually complex. It is necessary to make an exact diagnosis early and to be prepared to meet sudden complications. In the speaker's hospital, chest injuries constitute about 7% of all hospitalized accident cases. Traffic accidents are responsible for nearly 60% of the closed injuries and criminal acts for about 70% of the stab wounds. In treating the closed injuries it is important to combat the shock. If there is no response to these measures, an accompanying abdominal lesion should be kept in mind. The airways must be kept clear in order to prevent the accumulation of secretions and the so-called wet lung syndrome. Cough and expectoration should be encouraged and, if unsatisfactory, endotracheal suction should be used. If this does not suffice tracheotomy should be performed. Ambulation should be encouraged as soon as possible, even in the presence of a resolving hemothorax. This helps the patient psychologically and promotes expectoration. The routine use of antibiotics is not advisable but should be reserved for those patients in whom infectious complications appear to be imminent. In a series of 187 patients treated for closed injuries of the chest, 128 made an uneventful recovery and left the hospital in good condition in an average of 11 days. Another 44 made a satisfactory recovery, but remained in the hospital for a longer period because of other injuries. Complications developed in 18 patients, one of whom died. Two patients were operated on successfully, and only 17 patients died as a result of the chest injury.

The physician must not only take the pulse rate and blood pressure of patients with chest injuries but also auscultate the heart, percuss the cardiac area, and look for evidence of cardiac tamponade. To attribute the lowering of blood pressure and distant heart sounds to a state of shock, thus overlooking a cardiac wound, could easily result in the death of the patient. If evidence of cardiac tamponade is elicited, surgical intervention should be performed through a thoracotomy incision in the left side of the heart. The pericardium should be opened wide to evacuate clots. The heart wound should be plugged with the thumb and index finger of the left hand and closed with interrupted sutures of nonabsorbable material. The speaker said that, although closure of the cardiac wound even in the presence of severe shock was advocated until recently, a less hurried attitude gives better results. Pericardial tap may be used to relieve cardiac strain while shock is being treated with blood transfusions and other measures.

Symposium on Cancer.—At the same meeting Dr. W. F. Rienhoff of Baltimore said that there is little if any scientific evidence advanced in support of the theory that cigarette smoking increases the likelihood of lung cancer. Animal experiments have given contradictory results in the hands of various investigators, and attempts to isolate a known carcinogenic hydrocarbon from tobacco tar so far have failed. A true parallelism between the rise in cigarette consumption and lung cancer in the last 30 years cannot be shown. The incidence of lung cancers had increased long before cigarette smoking became widespread. It is also surprising to note the absence of positive statistical association between lung cancer and cigarette cough, although this type of cough is common among chronic chain smokers. Despite the fact that the lips and oral mucosa are constantly bathed in the tarry liquor oozing from the tip of the cigarette, and despite the contact of these parts with the smoke coming from the cigarettes, no increase in the incidence of cancer of these parts has been observed. The claim that no tarry material exudes from the cigarette is disproved by the fact that chain smokers have notoriously brown stained fingers. Furthermore, no cancers of the skin of the fingers have been attributed to cigarette smoking. The only experimental evidence supporting the carcinogenic properties of tobacco tar is the development of cancer in the skin of hyperreactive animals that were exposed to such tar. The speaker concluded that it would be injudicious to base the prevention of lung cancer on a theory of such doubtful scientific merits and to concentrate the immediate epidemiological and experimental efforts on this apparently overpropagandized concept.

Dr. Alton Ochsner of New Orleans said that if the incidence of lung cancer increases at the present rate in the United States, it is likely that in 1970 lung cancer would account for 18% of all cancers. The assumption that lung cancer is not increasing but it is now better recognized is refuted by the fact that (1) if this were so a diagnosis of pulmonary tuberculosis would have been made in these patients, but the statistics for 1933 to 1948 show that incidence of tuberculosis showed little change, whereas that of lung cancer has definitely increased and (2) in several European countries where in the last 100 years autopsy has been obligatory, the incidence of lung cancer has increased at a rate comparable to that reported in the United States. Researches carried out by the American Cancer Society on 200,000 persons revealed that deaths from all causes are more frequent among cigarette smokers than among nonsmokers and that deaths due to all forms of cancer are also more frequent in the former than in the latter group. Statistically significant associations between cigarette smoking and the development of lung cancer are demonstrable in most men dying of lung cancer and the likelihood of cancer of the lung developing seems to increase with the number of cigarettes smoked daily. The speaker believed that an incontrovertible relation existed between the increasing incidence of lung cancer and the increased amount of cigarette smoking. Autopsy studies made in the last two years on a large number of cigarette smokers who died of causes other than cancer revealed precancerous pulmonary lesions in many of them. The use of cigarette filters does not appear to lessen the chances of lung cancer. The speaker urged that a search be made for the carcinogens involved in the production of lung cancers so that they may be eliminated.

Dr. Alberto Sabogal of the National Institute of Neoplastic Diseases reported a series of 25 patients with cancer of the rectum. The time elapsed between the first symptoms and the consultation varied from four days to four years. Most patients arrived at the institute with far-advanced inoperable cancer. Almost all of the patients had severe anemia, malnutrition, fluid and electrolyte imbalance, and secondary infection. An abdominoperineal resection was performed on 11 patients, 2 of whom died in the immediate postoperative period and 1 of whom recovered but died later. In patients with adenocarcinoma bleeding of the rectum was the most common early symptom, and in those with epidermoid tumors the first symptom was a noticeable anal tumor. Dr. L. A. MacKay and his associates of Santiago, Chile, reported a series of 132 patients with cancer of the anus, rectosigmoid, and colon. The highest incidence was observed in the age groups 41 to 50 and 61 to 70. Involvement of the rectum was found in 71 patients. Although 44 patients were first seen between one and five months after the onset, the majority arrived at the hospital with advanced lesions. The most common symptoms were bleeding and general debility in those patients with anal and rectosigmoid cancers, and constipation and general debility in those with cancer of the colon. Most of the cancers were adenocarcinomas. Eighty-one were found to be operable, 39 were inoperable, and 12 patients refused operation. Preoperative sterilization of the colon is essential.

Dr. C. W. Muckle of Philadelphia said that ovarian cancer embraces a group of diseases with an insidious onset that are difficult to diagnose because in the early stages there are no symptoms. Later there may be abdominal swelling, abdominal tumor, loss of weight, urinary disturbances, and digestive alterations. Surgical removal is advisable for all cysts larger than 5 cm. in diameter. A histological study of the operative specimen should be made in order to determine the diagnosis. The operation of choice is total hysterectomy with bilateral salpingo-oophorectomy, because the cancer often affects both ovaries though the ovary on the opposite side appears grossly normal.

Dr. Marden Black of the United States said that the extent of the operation for thyroid cancer depends on the type of lesion and the presence or absence of metastases. In tumors confined to the gland, the whole of the affected lobe and part of the second lobe must be removed. Wide excision of the cervical lymph nodes is rarely indicated, unless metastases from a papillary carcinoma have invaded the lateral cervical chain; in other types of cancer hematogenous spread is likely to occur before infiltration of the lymphatics. The sternocleidomastoid muscle should be preserved for esthetic reasons. Mediastinal lymphatic dissections should only be made when removable metastases from a papillary carcinoma are found. Treatment with radioactive iodine is only to be applied to inoperable tumors, and in some cases this should be preceded by a total thyroidectomy in order to increase the iodine uptake of the metastasized tissue. At this operation as much malignant tissue as possible should be removed. Because of the danger of postoperative myxedema, chronic tetany, etc., this operation should be performed only if it offers some likelihood of improvement.

Dr. M. E. De Bakey of Houston, Texas, reported a series of 199 patients on whom a gastrectomy was performed because of gastroduodenal perforations. He said that mortality and morbidity rates in the patients who underwent partial gastrectomy were lower than those of patients treated with simple suture. When the perforation is due to peptic ulcer, good results are observed in 80 to 95% of the patients. Neither mortality rates nor morbidity rates have been reduced by using other surgical procedures.

Symposium on Surgical Tuberculosis.—At the same meeting Drs. A. A. Asenjo and M. Castro of Santiago, Chile, reported a series of 117 patients with verified tuberculomas of the brain. The absence of tuberculous lesions in the lungs by no means invalidates the diagnosis of cerebral tuberculoma. The treatment and prognosis of the disease as well as the postoperative results have been greatly improved since the advent of effective chemotherapy. Before streptomycin became available, 43 of 88 patients with tuberculomas of the brain died. Dr. A. Montagne of Lima, Peru, reported a series of 304 patients with tuberculosis of the bones and joints. He said that since 1947 when streptomycin became available the cure and prognosis of osteoarticular tuberculosis have greatly improved and that the use of isoniazid appears to offer these patients a definite chance for cure. The use of one or both of these drugs in the speaker's series caused a fall of the mortality rate from 9.6 to 2.6% and an increase in clinical cures from 37 to 65.5%. Dr. J. M. Allende and D. A. Allende of Córdoba, Argentina, said that in treating hydatid cyst of the lung they prefer to close the bronchi and obliterate the residual cavity, using marsupialization and drainage only for those patients who are poor surgical risks and for very rare patients in whom resection is technically impossible. They recommend this procedure for those patients with small or middle-sized uncomplicated cysts, reserving wide resections for large uncomplicated cysts that damage the surrounding pulmonary tissue, and for complicated cysts. They advocate evacuation of parasites and dissection of the pericystic membrane in those small cysts that develop either in a fissure or well over the lung surface.

GOVERNMENT SERVICES

SECRETARY OF DEFENSE

Doctor Goodpasture Appointed Scientific Director.—Dr. Ernest W. Goodpasture, professor of pathology, Vanderbilt University, has been appointed scientific director of the department of pathology of the Armed Forces Institute of Pathology, Washington, D. C. He will assume the position July 1. The new appointment was recommended by the scientific advisory board of the Armed Forces Institute of Pathology at a recent meeting. The institute is the central laboratory of pathology for the U. S. Army, Navy, Air Force, Veterans Administration, Public Health Service, and for the Atomic Energy Commission and other agencies. It has four major departments: department of pathology, American registry of pathology, medical illustration service, and the medical museum. As scientific director, Dr. Goodpasture will be responsible for the supervision of the professional functions of the department, which include diagnostic consultative services in pathology, an advanced teaching program, and experimental studies in pathology and the ancillary sciences.

Ernest W. Goodpasture, M.D.

Dr. Goodpasture is a member of the section on virus and rickettsia, U. S. Public Health Service; a director of the Institute of Nuclear Studies, Oak Ridge, Tenn.; member of the advisory committee on biology and medicine, Atomic Energy Commission; and a consultant to the health division of the Tennessee Valley Authority. He has been awarded the Kober medal of the Association of American Physicians, the Sedgwick Memorial medal of the American Public Health Association, the John Scott award of the city of Philadelphia, the Passano Foundation award, and the John Phillips Memorial award of the American College of Physicians. He is a past president of the Association of Pathology and Bacteriology and of the Society of Experimental Pathology. He is said to have been the first to use the unhatched chicken in its incubation stage for the growing of viruses. A wartime use of his technique was the production of yellow fever vaccine for use in all troops sent overseas. Dr. Goodpasture, whose professional record also includes other extensive work in original research as well as in teaching pathology, will now lend his experience to student pathologists from all over the world who come to the Armed Forces Institute of Pathology for advanced study.

ARMY

New Jobs for Retired Officers.—Brig. Gen. Rawley E. Chambers, M. C., chief, professional division, Office of the Surgeon General, retired April 30 after more than 29 years' service in the Army. General Chambers, who served in World War I as an enlisted man with the field artillery and eventually rose to be the Army's chief psychiatrist, will become mental director for the Texas State hospitals and special schools, with offices in Austin, Texas.——Col. Paul H. Martin, M. C., who retired from the Army Jan. 31, plans to become health commissioner of the Elkhart County health unit in Goshen, Ind.

NAVY

Physicians Wanted.—The U. S. Naval Ammunition Depot, Crane, Ind., has two vacancies for medical officers. The positions of medical officer, GS-11, at $5,940 a year plus overtime, and available part-time private practice in nearby housing projects, are in the medical department. Applicants must be graduates of a medical school of recognized standing, with the degree of Doctor of Medicine, must have completed an approved full rotating internship, and must be currently licensed or able to obtain a license to practice medicine and surgery in the state of Indiana. Applications should be sent to the Civilian Industrial Relations Director, U. S. Naval Ammunition Depot, Crane, Ind.

Personal.—Rear Adm. Sterling Smith Cook, M. C., was placed on the temporary disability retired list on Feb. 1, 1955, after more than 37 years' service in the Navy.——The following officers of the Medical Department of the Navy were retired on Feb. 1: Capt. John Matthew Bachulus, M. C. (placed on the temporary disability retired list), after more than 30 years service; Capt. Gerald Walker Smith, M. C., after more than 28 years' naval service; and Capt. Frederic William Farrar, M. C., after more than 26 years' service.——Capt. Isaac B. Polak, M. C., retired on Jan. 1, after more than 36 years of naval service. ——Commander John R. Seal, M. C., head of the communicable disease and environmental sanitation branches, Preventive Medicine Division, Bureau of Medicine and Surgery, on March 9 addressed the staff and students of Vanderbilt University School of Medicine, Nashville, Tenn., on "Progress in the Conquest of Epidemic Respiratory Diseases in the Armed Forces."——Capt. Paul Peterson was placed on the retired list following more than 22 years of service in the Medical Corps of the Navy. His home address is 6490 Cleo St., San Diego, Calif.

VETERANS ADMINISTRATION

Residents Wanted at Albany, N. Y.—The Veterans Administration Hospital, Albany, N. Y., has vacancies for eight first and second year residents in internal medicine and eight first and second year residents in general surgery, beginning July 1, 1955, Sept. 1, 1955, and Jan. 1, 1956. The training program is affiliated with the Albany Medical College. The annual stipend ranges from $2,640 to $3,300. Bachelor quarters are available, with a modest amount deducted for meals and lodging. Korean GI trainees may receive their allotments in addition to the hospital salary. Vacancies also exist for one full-time neurologist and two full-time general surgeons.

Hospital News.—Dr. Jerome Hartz, assistant professor of psychiatry, Johns Hopkins School of Medicine, addressed the House Staff Association and the staff physicians of the Veterans Administration Hospital in West Haven, Conn., Jan. 28, on "Psychosomatic Aspects of Tuberculosis."

PUBLIC HEALTH SERVICE

Psychiatric Consultation.—Dr. Robert T. Hewitt has been appointed chief of the mental hospital consultation and survey service of the National Institutes of Mental Health. The section that Dr. Hewitt heads will provide consultative services when requested by state agencies in charge of mental health and hospital programs. Mental health consultants in the departmental regional offices throughout the country will work closely with Dr. Hewitt and the National Institutes headquarters providing consultation to and liaison with state hospital systems in special studies and demonstration projects. Dr. Hewitt, a psychiatrist, has held several posts in mental health treatment and research facilities of the Public Health Service.

History of the Public Health Service.—"Public Health Service Today" is the title of a new and revised edition of a booklet that reviews the history of the U. S. Public Health Service and discusses its organization, structure, and responsibilities in the total health picture of the nation. It is a Public Health Service Publication no. 165.

COUNCIL ON MEDICAL SERVICE

MEDICAL CARE FOR THE INDIGENT IN WASHINGTON

This is the 17th in a series of studies made by the Committee on Indigent Care of the Council on Medical Service concerning local plans for medical care of the indigent.

This is a study of medical care available for the indigent and medically indigent in the state of Washington. In 1953, the state had an estimated population of 2,520,000; since 1940, the population has increased at a rate more than double that of the nation as a whole. More than half of the state's residents live in 3 of its 39 counties, which include the cities of Seattle, Spokane, and Tacoma. Agriculture, lumbering, fishing, and the by-products of these industries are the main industries of Washington; classified according to per capita income it is among the top 12 states.

ELIGIBLE POPULATION

All persons on the assistance rolls are automatically eligible for medical care. In Washington, assistance clients (known as "welfare recipients") are certified by the state department of public assistance. There are two types of assistance: continuing assistance, for clients who receive monthly grants over a long period of time, and noncontinuing assistance, for those who are certified for a short period, a month being the maximum per certification. Both public assistance (federally aided) and long-term general assistance clients are included in the continuing assistance classification, while noncontinuing assistance comprises those general assistance clients who are unemployed but employable (e. g., seasonal workers in the fruit-picking industry). Medical indigents are certified by the state department of health and are eligible for the same medical care as those on public and general assistance rolls.

TABLE 1.—*Persons Eligible for Medical Care (Average Month, 1953-1954)*

	No. Eligible	
Public assistance	103,670	
Old age assistance		66,745
Aid to dependent children		29,846
Aid to the blind		861
Aid to permanently and totally disabled		6,218
General assistance (continuing and noncontinuing)	17,110	
Child welfare service *	2,371	
Medical indigents	1,639	
Total	124,705	

* Excludes those in children's and maternity homes.

As shown in table 1, approximately 4.9% of Washington's population was eligible for indigent medical care during an average month in the year beginning April, 1953.

ADMINISTRATION

The state laws place the responsibility for administration of the welfare medical care program on the department of health but do not allow the department to provide services directly. The program is expected to provide for necessary physicians' services and hospital care and may also provide such allied services as dental care, ambulance service, drugs, and medical supplies in the home. The program is administered through the division of medical service, consisting of four administrative sections that deal with physicians' and ancillary services, screening physicians and medical service workers, hospitals, and statistics. Physicians' services for all counties except King County (Seattle) are obtained through a contract with the Washington Physicians' Service, Inc., which represents all of Washington's medical service bureaus. These bureaus incorporated by county or multicounty medical societies to administer local medical prepayment plans (primarily for low income groups) provide coverage in all counties. The state organization acts as a contracting agency for statewide coverage.

Each bureau is administered by a business manager who audits all bills for physicians' services to the indigent. Bills for the care of continuing assistance recipients are paid directly from bureau funds, while bills for services to noncontinuing assistance clients and medical indigents are sent to the state health department for payment. In addition, the bureau furnishes office space, clerical help and supplies for the health department's medical and dental screeners, and a medical service worker. The "medical screener" is a physician employed by the department of health on the recommendation of the county medical society. He must authorize any medical services to the indigent not provided under contract by the Washington Physicians' Service, Inc., including care of the medically indigent, medical care for nursing home patients, and attendant care or homemaker services. He examines or authorizes examinations of assistance applicants for determination of employability when medical conditions are the basis for need, and makes medical evaluation of total and permanent disability as requested by the assistance department; this system provides a budget control on the local level. Dental screeners have much the same function, but the department may choose any dentist in the district for the position. The medical service worker, also employed by the health department, evaluates medical indigency and places assistance clients in the proper type of medical facility. Rotating committees of pharmacists have been set up in some districts to preaudit drug bills, but in most bureaus bills are evaluated by the screening physician.

Some measure of control is provided by a state welfare medical care committee appointed by the governor, which consists of 12 members: 6 representing the providers of medical services, one legislator, one county commissioner, and 4 public members. This committee helps the director of health to prepare the biennial appropriation request and establishes administrative regulations. Some areas have local welfare medical care committees, with a maximum of eight members, half representing the providers of medical services and half the public, which advise and assist the local health department in implementing the state committee's regulations and the health department's administrative policies. The state welfare medical care committee sometimes accepts responsibility for suggestions made by the state health department, but bills now under consideration to return the medical care program to the public assistance department, which administered it until about 1951, reduce this committee to a purely advisory body. The 1955 session of the legislature returned the program to the Department of Social Security, effective July 1, 1955. It is expected that much the same methods will be used as at present. Recipients who disagree with a screener's decision may request a hearing or an appeal to a state examiner or, if still dissatisfied, may take their cases to court. However, no such requests were made from mid-1953 to the fall of 1954. Screeners decide on most cases involving vendors of medical services, and their decisions are almost invariably supported by the board of trustees of the local bureau and of the local medical society. Physicians may bring grievances to these boards but few do so or have any complaints of discrimination in the program. The bureau's board may, however, censure physicians whom they decide are abusing the program.

SERVICES AVAILABLE

All essential services are available to the indigent and medically indigent in all parts of the state. Except in King County, indigents on the continuing assistance programs receive medical care on the same basis as nonindigent, prepaid patients, and most local hospitals have contracts with the health department for inhospital care. In some areas, the bureaus require prior authorization for all physicians' services, except in extreme emergencies. Other bureaus will pay the physicians for the first visit from an assistance client, whether or not authorized, but

Members of the Committee on Indigent Care are: Drs. H. B. Mulholland, Chairman, Charlottesville, Va.; E. A. Ockuly, Toledo, Ohio; Dean W. Roberts, Baltimore; A. J. Bowles, Seattle; E. P. Coleman, Canton, Ill.; J. L. Lattimore, Topeka, Kan.; and I. Jay Brightman, Albany, N. Y.; and Mr. R. M. Hilliard, Consultant, Chicago.

require authorization for all subsequent visits. Patients are admitted to nursing homes when the attending physician so requests and the screening physician authorizes admission. The medical service worker makes the necessary arrangements. The patient or his relatives may select the nursing home, provided that necessary care is available at the rate of payment set by the health department. Some hospitals have rooms for nursing home care; here the patient need not be transferred for convalescent care. Screening physicians and attending physicians review the medical status of nursing home patients at least every three months to determine if they are receiving proper care and if nursing home care should be continued. Dental care for indigents is limited to emergency cases; priority is given to the care of children's teeth. Dentures are issued only if less than six teeth occlude, no partial plates are provided, and damaged dentures are replaced only if there is serious difficulty in mastication. Except in emergency cases, optical refractions are limited to one every two years, and indigents receive post cards biennially reminding them to return for the new examination. The health department provides preoperative and postoperative care for blind patients for whom the division of the blind provides surgical care. Hospital care is provided within the limits considered necessary by the attending physician, through contracts with the individual hospitals.

PROVIDERS OF SERVICE

Except in King County, any physician licensed to practice in Washington who signs the agreement with the local medical service bureau and the health department may be reimbursed for authorized care rendered to the state's indigents. (In Washington, the term "physician" includes osteopaths, who are licensed to practice but are not members of the medical society or the bureau and thus do not determine policy.) In King County, the bureau has not contracted with the health department and agreements are made directly with the practitioners by the department; the indigent receive a list of participating physicians. Approximately 95% of the state's physicians have contracted to provide care for the indigent; the patient, therefore, has almost unlimited free choice of physician. However, the client must remain under the care of the same physician at least three to six months, unless he is completely dissatisfied and the physician agrees that he should choose another doctor.

In King County, the bureau system is not utilized. All indigent patients in the county receive care through the county hospital, Harborview; this is the teaching hospital for the University of Washington medical school and is the largest of the state's county hospitals, with 450 beds and an outpatient load of about 9,000 per month. All medical care is provided by staff physicians. The screening physician must be recommended by the local county medical society. He may be a full-time or part-time department employee but may also have a private practice; many screeners also act for the local bureau and, thus, authorize all phases of medical care for indigents. Any dentist in the community may be hired to act as a dental screener for the health department, and any dentist licensed to practice in the state may provide dental care.

In 1953, Washington had approximately 138 hospitals with some 26,000 beds. All but three hospitals in the state have signed contracts with the state health department to provide care to the indigent. The state's five county hospitals are supposed to be utilized whenever possible, but only in King County is this policy enforced. Since the King County hospital is the state's teaching hospital, it is utilized for all indigent care except in extreme emergencies or when a patient is not known to be indigent until after admission. (In such cases, the patient is transferred to Harborview as soon as possible after his financial status is determined.) All nursing homes that meet state standards are eligible to provide indigent care. Homes are classified, by facilities and personnel, as to which of four types of chronic and convalescent care they are qualified to provide—from those which can care only for the least seriously ill to those that can care for all types of patients. The state has 298 qualified nursing homes, with a total of 9,023 beds; approximately 66% of the occupants of these homes are welfare patients. Any pharmacist in the state may sign an agreement with the health department to provide clients with drugs listed in the department's formulary, when prescribed by a physician. Common household drugs and supplies are not provided by the state, and unusual drugs not listed in the formulary will be provided only when authorized by the screener.

PAYMENT FOR SERVICES

Each month the department of public assistance provides the health department and the Washington physicians' service with a complete list, by county, of all welfare recipients for the previous month. The health department then pays the physicians' service $2.60 for each person on continuing assistance ($2.15 for medical service and $0.45 for administration). This money is allocated to the local bureaus in proportion to the number of indigents in each county and the bureau pays for the care of continuing assistance clients. For care provided to noncontinuing assistance clients and medical indigents, the physician also submits his bills to the local bureau. However, this care is not covered by the capitation payment system; the bureau transmits the bills to the health department, which pays for such care on a fee-for-service basis, sending the payment to the bureau for transmittal to the physician. Prior to 1954, care for noncontinuing assistance clients was also provided through capitation payments to the bureaus on the same basis as the rest of the program. However, it was found that in some sections where employment is seasonal many persons were on the rolls during the off seasons and few were ill, while in other areas where employment is available the year round most of these clients were on the rolls because of illness. Thus, in one type of area, the capitation payment was more than adequate for medical care, while in the other area the allotment was much too small.

The fee schedule agreed upon with the local bureau is used for all assistance categories; in most cases it is the schedule used for the local prepayment plan, but a separate schedule may be used for indigent care. (King County physicians are paid directly by the state health department for out-of-hospital services, at a rate 20% below the King County bureau's fee schedule.) Two general methods of payment are in use to keep payments within appropriation limitations. In some districts, the number of services provided are limited so that a dollar-for-dollar payment may be made according to the fee schedule. In other areas, there is less limitation of services provided and payments are prorated in accordance with the available funds. Some of these systems pay the physician 50% of the agreed fee from the monthly allotment and prorate the remaining 50% at the end of the fiscal year according to the amount remaining in the bureau's fund. Other bureaus establish an average payment, based on the total funds available and the total number of cases, and pay a set fee per case. Here, also, the physician may receive 50% from the monthly allotment, with the remaining 50% prorated at the end of the year. The health department pays for deep x-ray therapy and anesthesia according to its own fee schedule. These are the only physicians' services rendered to continuing assistance clients not paid for from the monthly capitation payment to the bureaus. Screening physicians receive from $200 to $700 per month on a fee-for-service basis and screening dentists are paid on an hourly basis.

Most of the cooperating hospitals are paid an agreed ward rate, which averages about $11.30 per diem, with a $13.50 maximum. These ward rates were established in 1951 and, since the ward rate for private patients in most hospitals has since increased to about $15 per day, the hospitals are attempting to obtain a corresponding increase in health department payments. These hospitals receive an additional payment of $2.15 per day to cover the cost of dressings and most drugs. However, hormones are paid for on a cost plus basis and other services, such as surgery, x-ray, injections, and infusions, are paid for according to a fee schedule established by the department. A few hospitals have established all-inclusive rates, ranging from $14 to $19 per day, which cover all services provided assistance clients. King County's Harborview Hospital has an inpatient cost of $18.50 per day and an average cost of $2.05 per treatment for outpatient care. Staff physicians receive no remuneration for care to the indigent, who are treated as staff cases. Some Oregon and Idaho hospitals also have contracts with the health department to provide care for certain districts on the Washington state line that are not sufficiently close to any Washington hospital. Nursing homes in the state are paid a per diem rate that varies according to the type of care provided. Four rates have

been established, ranging from $33 to $123 per month. In addition, the department of public assistance pays a flat rate of $57 per month for maintenance for assistance clients in these homes. If requested to do so by the attending physician, the health department pays for visiting nurse care and will pay for private duty nursing in cases of extreme urgency.

COST AND FINANCIAL SUPPORT

The medical care program is supported entirely by state funds. Federal funds cannot be obtained for the medical care program since the Social Security regulations require that a program be administered by a single agency. Present recommendations that the program be returned to welfare department control take this factor into account. Cost estimates are presented to the legislature biennially by the health department; the legislature may make deficiency appropriations if the amount allotted proves insufficient to meet costs. Table 2 shows the number of recipients of each type of care in an average month in 1953, the cost of each type of care, and the percentage of those eligible receiving care. About 85% of the patients receive physicians' care, but the cost of nursing home care, provided to one-fourth the number of patients, is the largest item on the budget—double the cost of physicians' services.

In table 3, the total services and costs have been classified according to the assistance program of which the patient is a client, except for some services that are not categorized by the health department as to program. Old age assistance clients comprise a little more than half the total assistance load but receive almost three-quarters of the medical services; aid to dependent children clients comprise almost a quarter of the load but use less than 10% of the services. The average monthly recipient load is expected to decrease from 127,218 in the 1951-1953 biennium to 124,000 in the 1953-1955 biennium; however, the appropriation request increased from $30,000,000 to $37,500,000 for the latter period. The increase in the cost of services occurs primarily in the audit of physicians' services, which has increased $600,000, and nursing home care, which increased about $6,700,000. Excluding these two items, the appropriation request increased only $300,000 over the two year

TABLE 2.—*Services and Costs of Washington Indigent Medical Care Program (Average Month, April-December, 1953)*

Service	Welfare Recipients: Recipients of Care	Welfare Recipients: % of Eligible Clients	Welfare Recipients: Cost	Medical Indigents: Recipients of Care	Medical Indigents: Cost
Physicians	19,373	16.1	$217,929.48	371	$ 18,764.12
Medical screening	.....	...	14,209.32	...	.....
Hospital care	2,687	2.2	411,362.63	1,212	192,979.57
Outpatient care *	155	0.1	1,614.23	12	431.74
Drugs	.....	...	95,077.67	...	1,056.44
Dental care and appliances	956	0.8	41,155.07	20	945.77
Dental screening	.....	...	2,299.70	...	.....
Prosthetic appliances and supplies	1,095	0.9	17,235.31	8	178.31
Ambulance	896	0.7	7,835.33	30	309.53
Children's and maternity homes	672	...	4,603.73	...	.....
Hospital extension	.....	...	3,355.08	...	.....
County infirmary	393	0.3	49,701.59	138	17,752.56
Nursing homes	5,531	4.6	422,447.51	112	9,645.17
Total services	32,041	...	$1,293,034.90	1,896	$242,077.89
Unduplicated total (individuals served)	22,800	18.9	.....	1,639	.....

* Approximately 1,500 welfare recipients and 2,000 medical indigents per month receive outpatient care at county hospitals; the cost of these services is included in the cost of hospital care above.

period. Allowing for the general increase in costs common in all industries and professions during these years, the main reason for the increase is the rise in nursing home costs.

MEDICAL SOCIETY PARTICIPATION

All physicians' services, except in King County, are provided through contacts with the medical service bureaus, which are approved and supervised by the local medical societies. The program, therefore, depends very strongly on medical society cooperation for the provision of indigent medical care. Apparently, there is no difficulty in obtaining physicians' services nor do the physicians complain about the program, although there was some dissatisfaction when it was initiated. The fact that the medical screener must have the approval of the medical society aids in maintaining amicable relations with the medical profession.

TABLE 3.—*Distribution of Services and Costs, by Program (Average Month, April-December, 1953)*

Program	Clients: No.	Clients: % of Total	Services: No.	Services: % of Total	Cost: Amount	Cost: % of Total
Old age assistance	67,172	55.9	8,833	73.6	$790,864.08	75.3
Aid to blind	863	0.7	95	0.8	8,308.85	0.8
Aid to dependent children	29,899	24.9	1,051	8.8	66,902.57	6.4
General assistance	13,581	11.3	916	7.6	89,292.12	8.5
Child welfare	2,333	1.9	155	1.3	7,634.02	0.7
Disability assistance	6,220	5.2	946	7.9	87,257.29	8.3
All programs	120,068	...	11,996	...	1,050,258.93	...
Medical indigent	1,639	...	1,896	...	242,077.89	...
Unclassified services *	.....	...	20,045	...	242,875.97	...
Total	121,707	...	33,937 †	...	$1,535,212.79	...

* Includes physicians, medical screening, dental screening, hearing aids, children's and maternity homes, and hospital extension (see table 2). None of these items is classified as to the program through which the services were provided.

† No correction has been made to allow for duplication. The actual number of persons receiving care is 22,800 welfare recipients and 1,639 medical indigents, a total of 24,439 patients.

In King County, however, there is no contract between the health department and the medical service bureau because of the exclusive use of the county hospitals to provide inhospital care for indigents. Since the hospital has a closed staff, any physician not a staff member must relinquish care of an indigent patient during hospitalization. The local medical society disapproves of this limitation to one hospital; however, this seems to be the only county in which the medical profession has any serious complaint concerning the program.

SUMMARY

The Washington indigent medical care program provides comprehensive health services for all classes of indigents: public assistance recipients, general assistance recipients (continuing and noncontinuing), and medical indigents. Within the limitations of the facilities available in the various counties, all assistance recipients and medical indigents receive approximately the same services. Certification of assistance clients is administered by the department of public assistance; certification of medical indigency and administration of the medical care program is in the hands of the state department of health. Actual provision of physicians' services (except in King County) is paid for through contracts with the state's medical service bureaus, on a capitation basis, for all clients except medical indigents and those on noncontinuing assistance. For these two classes of patients, payment is made through the bureaus on a fee-for-service basis, according to the bureau's fee schedules. Hospital care is provided through contracts with the state's private and county hospitals. Payment is usually made on a flat per diem rate for ward care plus an additional payment for auxiliary hospital services. In King County, care is provided primarily through the county hospital. Since this is a teaching hospital, indigents are treated as staff cases and physicians are not paid for inhospital care. Out-of-hospital care is provided through contracts with individual physicians, rather than with the local service bureau, and through the county hospital's outpatient department. Nursing homes are paid flat per diem rates, with the rate determined by the grade of care provided. Most other types of care are provided in accordance with health department fee schedules. The health department has medical and dental screeners working with each service bureau to decide on the authorization of all services not provided through the contract with the service bureau; the medical screeners must be approved by the local medical societies.

Administrative responsibility for the program is shared by the health department and the state welfare medical care committee, appointed by the governor, which not only advises the director of the program but also establishes many of the regu-

lations and policies. Thus the vendors of medical services play an important part in the administration of the program at all levels. With the exception of King County, the program provides free choice of physician and of other health personnel as authorized by the screening physicians and dentists; the indigent have access to all essential health services and facilities. There is some dissatisfaction on the part of physicians with the method of providing care in King County and on the part of the hospitals with the rate of payment allowed; in general, however, the participating professions seem to feel that the program is adequate and effective.

MISCELLANY

THE GENTLE ART OF POISONING

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Long before the dawn of written history man doubtless discovered by accident that certain plants or minerals and even animals were harmful if eaten. His natural cupidity did the rest. Thus in the earliest literature we have familiar remarks concerning venoms, poisonous herbs and death-dealing minerals.

The reasons for the development of poisoning are not hard to see. The potency of a pinch of powder that might with ease remove from this sphere of mortal action an enemy, be he prince or pauper, fired the imagination. Thwarted ambition, jealous love, and envious hate might now come into their own. Here was a field in which the weak and the strong, the coward and the hero were equal. It took no martial accouterments to drop death into a goblet of wine. The weaker sex and an unmilitary race, the Jews, furnished the largest number of those who devoted their talents to this hand maiden of death. At times in Rome, Italy and France so great were the numbers who would willingly undertake the removal of any desired person by poison and so marked the skill with which they could prepare their fatal wares and calm the fears of their very victims that it smacks neither of exaggeration nor frivolity to speak of the "gentle art of poisoning."

Savage tribes have almost always had their own peculiar poisons. Spears and arrow heads were impregnated with these to hasten death. Homer tells us that Ulysses went to Ephyra "to learn the direful art to taint with deadly drugs the barbed dart." Ovid relates that the arrows of Hercules were tipped with snake venom. In Africa a paste from the seeds of Strophanthus hispidus was used. The pigmies of Central Africa are said to have crushed a species of red ant for the same purpose. The South American arrow poison, curara, secured from a species of strychnos is of course well known. The Malays used aconite, while the bushmen of South Africa depended on the poisonous properties of a leaf beetle. Pliny states that the Gauls used veratrum on their arrows.

That the Egyptians knew considerable about poisons we may be sure, although details are lacking. In an old papyrus preserved at the Louvre is the command "Speak not of the name of I. A. O. under the penalty of the peach." This suggests that possibly the preparation of HCN in some form was known and that the priests stood ready to use it for any who betrayed their brotherhood. The papyrus Ebers preserved at Leipzig and believed to date from 1500 B. C., refers both to mineral and vegetable poisons. Lead, antimony, copper, opium, and hyoscyamus are mentioned. In addition it is known that the early Egyptians knew the use of hemlock, squills, and castor oil.

One of the Vedas written about 900 B. C. shows that the Hindus of that time had a rather extensive knowledge of poisons. Antidotes are taken up in detail and much advice is given the physician regarding such matters. Three varieties of Datura seem to have been used to terminate domestic quarrels. It has been suggested that the practice of "suttee" or burning of the widow on the death of the husband may have had its origin as a discouragement to conjugal homicide. The Veda gives the physician specific directions in the detection of poisoners.

> He does not answer questions, or the answers are evasive. He speaks nonsense, rubs the great toe along the ground and shivers. His face is discolored. He rubs the roots of the hair with his fingers and he tries by every means to leave the house. The food which is suspected should be given to animals. It is necessary for the practitioner to have knowledge of the symptoms of the different poisons and their antidotes, as the enemies of the Raja, bad women and ungrateful servants sometimes mix poison with food.

In Hebrew literature there are few references to poisons or poisoners. There are allusions to the venom of serpents, and to a substance sudaim, probably mandrake. The "bitter waters" referred to in Numbers as an ordeal for testing the faithfulness of a wife must have had some poisonous property if the results were ever positive. The witches of the Old Testament were probably sorcerers and poison venders.

So ancient is poison lore that many references to it are found in Greek mythology. There are occasional references to the removal of inconvenient husbands by wives who were too much versed in the ways of the world and the use of aconite. In the far North lived the children of the Sun, all of whom were versed in sorcery and kindred abominations. Here dwelt Hecate and her husband Aeëtes and their daughter Medea. Hecate was the discoverer of poisonous herbs, and her knowledge was passed on to Medea who by her magic aided Jason to secure the Golden Fleece. Later she tried to poison Eegous, the King of Athens. Gula, a divinity of the Accadians, was regarded as "the mistress and controller of noxious poisons" thousands of years before the Christian era.

With the dawn of the classical period of Greek history, we have not only many references to poisons but the works of certain physicians on the subject. Theophrastus, 370-286 B. C., pupil, friend and successor of Aristotle, has been known as the "proto-botanist" because in his De Historia Plantarum he described over 500 different plants. His work contains many references to poisonous and medicinal plants.

The first work to deal specifically with poisons is that of Nicander of Colophon who lived from 204-135 B. C. He wrote two poems, one of 1,000 lines, the "Theriaca," which dealt with poisonous animals and the other the "Alexipharmaca" of 600 lines which had to do with antidotes. In these verses is much that is fabulous yet there is a certain knowledge displayed that must have been born of experience. He describes the effects of snake venom, opium, henbane, fungi, colchicum, aconite and conium, recommending antidotes for each.

The originator of the materia medica was Dioscorides, the exact dates of whose life are not known. He was one of the Greek army surgeons under Nero which of course places him in the first century A. D. He was a student particularly of applied botany and described a hundred more plants than were to be found in Theophrastus. One of his books dealt with animal products of medicinal value. He thus covered the field of animal and vegetable poison and gave the following list of substances including the minerals that he recognized as poisonous.

A. Animal Kingdom: 1. Cantharides; 2. Marine Hare—some crustaceans, toads, salamanders and serpents; 3. Blood of the wild bull; 4. Honey of Heraclea.

B. Vegetable Kingdom: 1. Mandragora; 2. Aconite; 3. Colchicum (meadow saffron); 4. Opium; 5. Hemlock.

C. Mineral Kingdom: 1. Arsenic; 2. Cinnabar; 3. Litharge; 4. White lead (carbonate).

This work of Dioscorides remained a standard for sixteen centuries. Up to the seventeenth century, the best books on medical botany were only commentaries on the treatise of Dioscorides.

Galen, A. D. 131-201, gives a list of the poisons used in his time. It differs little from the list of Dioscorides and Galen apologizes for the scant information concerning them by adding,

> That it is imprudent to treat of poisons and to make known their composition to the common people who would only profit from this by committing crimes.

It will be noted that Dioscorides mentions several forms of animal poisons that are quite unknown to modern pharmacology. The sea hare, for example, was probably a gasteropod of the

genus Aplysia. The ancient Greeks describe it as a horrible object which it was unsafe to handle or even look upon with safety. In later times it was said to have been given by Domitian to Titus. Quite likely its appearance and its unknown habits made it a fit subject for the imaginative powers of untrained naturalists. The same may probably be said concerning the crustaceans and salamanders.

Bull's blood had a great reputation as a poison with many of the ancients. It is not clear how it could display any injurious qualities unless it were allowed to putrefy or fortified with other poison. However, in mythology the death of Aeson and Midas of the golden touch are attributed to it. Herodotus relates that Psammenitus, 525 B. C., a king of Egypt who was conquered by Cambyses, having revolted was detected and forced to drink bull's blood which immediately occasioned his death. The death of Themistocles, the hero of Salamis, in 460 B. C. by this means would seem to be more authentic although Cicero ridicules the story. Plutarch in his life of Themistocles says,

> Having decided that his best course was to put a fitting end to his life, he made a sacrifice to the gods, then called his friends together, gave them a farewell clasp of his hand and as the current story goes drank the bull's blood, or, as some say, took a quick poison, and so died.

An interesting reference to this event is found in the "Knights" of Aristophanes written only a few years later in 424 B. C. Two slaves are discussing suicide.

> First slave: Let's die, then, once for all; that's the best way, only we must continue to manage it nobly and manfully in a proper manner.
>
> Second slave: Aye, Aye. Let's do things manfully, that's my maxim.
>
> First slave: Well, there's the example of Themistocles. To drink bull's blood, that seems a manly death.
>
> Second slave: Bull's blood. The blood of the grape I say, good wine.

Very little can be found concerning the honey of Heraclea mentioned by Dioscorides. It was produced in Bythnia and when eaten brought on madness and death. Some of the soldiers of Xenophon were taken with this intoxication which that famous author thus describes.

> They were delirious, vomited, purged, and could not stand on their legs. Those with only a taste were drunken; those who had more seemed mad, others dying. Those that recovered were still weak and fatigued three or four days.

This description reminds one of the symptoms following atropine or aconite. Since the latter was well known by the ancients, it is possible that the honey of Heraclea was made poisonous with this drug.

Plutarch describes an incident quite similar which occurred in the campaign of Mark Antony against the Parthians. The soldiers being short of rations sought for potherbs to increase their supply. The carrot-like root of aconite was mistaken for an edible vegetable and wholesale poisoning resulted.

> The eater immediately lost all memory and knowledge busying himself at the same time in turning and moving every stone he met with, as if he were on some important pursuit. The camp was full of unhappy men stooping to the ground until at last they were carried off by bilious vomiting.

Of all the poisons used by the ancient Greeks the best known was doubtless hemlock. Whether or not this was the "water hemlock," Conium inoculatum, was debated by the early toxicologists, but the question seems now to be settled in the affirmative. The plant was of course not a conifer but one of the Umbelliferae. The poisonous principle is coniine which has been further distinguished in modern times by being the first alkaloid synthesized.

In Greece during the classic period the state was the depository of poisons. These were administered to the condemned and to those who could convince the Curia that life was a burden and that it were better to end it. If their reasons were convincing, they were given a cup of hemlock. This same custom existed at the Phoenician colony of Marseilles.

The death of Socrates is of course the best known example of hemlock poisoning. Plato's description of the great philosopher's death has both literary and scientific merit.

> The attendant brought it ready pounded in a cup. On asking, "What shall I do?" Socrates was directed: "Nothing else than when you have drunk it, walk about until there is a heaviness in your legs. Then lie down, then it will do its purpose." He, having walked about, when he said that his legs were growing heavy, laid down on his back, and at the same time he who gave him the poison, taking hold of him, after a short interval examined his feet and legs; and then, having pressed his feet hard, he asked if he felt it; he said he did not, and after that he pressed his thighs; and thus passing higher he showed us that he was growing cold and stiff. Then Socrates touched himself and said that when the poison reached his heart he should then depart. But now the parts around the lower belly were almost cold, when uncovering himself, for he had been covered over, he said, and they were his last words: "Crito, we owe a cock to Aesculapius, pay it therefore and do not neglect it." Shortly after he gave a convulsive movement, and the attendant covered him, and his eyes were fixed; and Crito perceiving it closed his mouth and eyes.

Others who were poisoned with hemlock were Phocion, 317 B. C., and Theramener, one of the thirty tyrants, 404 B. C. Olympias, the widow of Philip of Macedon, is also known to have imprisoned her rival Eurydice and to have presented her with a sword, a rope, and a cup of hemlock, with the order to choose her own mode of death.

Demosthenes was another of the great Greeks whose life was terminated by poison. The orator sought retreat from his foes in the temple of Poseidon, Calabria. Before giving himself up he asked permission to write his friends. He quickly took poison that had been secreted in his pen and fell before the altar of the god.

The later Greeks gave a good deal of attention to counter poisons. Galen says that Zopyrus, a physician of Alexandria, invented an antidote against all poisons for Mithridates, King of Pontus. Celsus says it consisted of thirty-six ingredients. Galen gives the number as forty-four and Pliny generously increases it to fifty-four. At any rate when Mithridates wished to commit suicide in 63 B. C. so immunized was he that poisons had no effect on him and he had to have a mercenary dispatch him with the sword. Pompey had a translation made of the writings of Mithridates and thus the formula became a model for the theriacs and mithridatics of the Middle Ages. Among the best known of these antidotes for all poisons was venice treacle or the Theriac of Andromachus which had some sixty-four ingredients. These peculiar concoctions remained in the pharmacopoeias until Heberden's famous essay on the mithridatics in 1745 banished them forever.

Poisonings were frequent in Rome. Livy in Book VIII relates that in the year 423 of the Republic (331 B. C.) there were a great number of sudden deaths, all with the same symptoms which threw society into a panic. A slave finally announced that some twenty Roman matrons had formed a plot to rid themselves by poisoned beverages of those who displeased them, particularly those whose property they wished to inherit. On being taken the women offered as defense that they were brewing medicines. They were invited to test the remedies on themselves. They did so and all perished. The investigation was continued against their accomplices and a total of seventy were finally condemned and punished.

Livy states that there had never before been cases of poisoning in Rome. Whether or not this was true, certainly they were not the last. Similar cases of wholesale poisoning were investigated in 184 B. C. and 180 B. C. The former of these had to do with Bacchanalian orgies while the latter was probably some kind of a plague. At the time of the Civil Wars, poisoning became so common that Sulla in 82 B. C. issued an edict against such assassinations. This was the Lex Cornelia, the first legislative enactment against poisoning. Punishment consisted in deportation and confiscation of all goods. Later, provisions were added applying to pharmacists who dispensed carelessly.

The literature of the time, particularly that of the empire, is full of allusions to the common use of poisons. The patricians were especially guilty, judging from the remark of Juvenal that

> You will drink no aconite out of an earthenware cup—you may dread it when Setine wine sparkles in a golden bowl.

One of Cicero's most masterly orations was in defense of Cluentius who had been accused of poisoning. The defendant was acquitted. In Juvenal's sixth satire, which is devoted particularly to the female customs of the times, are numerous allusions to the slight regard that was held for human life. The murder of step-children called forth these savage lines from Juvenal.

> A wife hates the children of a concubine; let none demur or forbid, seeing that it has long been right and proper to slay a step-son. But I warn you wards—you that have a good estate—keep watch over your

lives, trust not a single dish; those hot cakes are black with poison of a mother's baking. Whatever is offered you by the mother, let some one taste it first; let your trembling tutor take the first taste of every cup.

Now think you that all of this is a fancy tale, and that our satire is taking to herself the high heels of tragedy? Think you that I have outstepped the limits and the laws of those before me, and am mouthing in Sophoclean tones a grand theme unknown to the Rutelian hills and skies of Latium? Would indeed that my words were idle! But here is Pontia proclaiming, "I did the deed; I gave the aconite, I confess it, to my children; the crime was detected, and is known to all; yes with my own hands I did it." "What, you most savage of vipers, you killed two, at a single meal?" "Aye, and seven, too, had there chanced to be seven to kill."

Under the emperors, professional poisoners were attached to the royal household. Such a one was Locusta, who served under Nero and even gave instructions to others in her fatal arts. Juvenal speaks of her as the agent for ridding many a wife of her husband and Tacitus remarks that she "was long reckoned as an instrument of government." Locusta first comes into prominence historically by aiding Agrippina in her attempt to poison her husband, the Emperor Claudius. As the story goes her potions were only powerful enough to make Claudius desperately ill. Agrippina then persuaded the king's physician to finish the task, which he did by dusting poison into the king's throat from a feather under the excuse of producing vomiting. Nero, though only a stepson, became emperor after Claudius, and under his commands, Locusta brought about the death of Britannicus, the natural son of Claudius and the rightful heir to the throne. Many of the details of this event have been preserved. In the first attempt the poison was found to be too weak, producing in Britannicus only a gastric irritation. At this Nero raged, and having sent for the poisoner, he struck her with his own hands and upbraided her for preparing a remedy instead of a poison. In his presence he forced her to prepare the most active preparation possible. That there might this time be no mistake he tried it on a kid which succumbed in five hours. He then had the concoction re-strengthened and tried it on a boar. The animal expired at once. It was then ordered to be sent into Britannicus who was taking his evening meal. In order to pass the taster it was added to a pitcher of cold water. The soup which was served the young man was purposely made too hot. Britannicus asked for some water to cool it. This the taster handed to him without of course tasting it. On partaking of the dish to which the poison had now been added the young prince fell over at once in convulsions. Nero who was present announced to the diners that it was an attack of epilepsy. In these days there was a superstition that the body of one poisoned would turn black. Fearing this Nero had the face of Britannicus painted with cosmetics. As a further precaution to hide his crime he decided that the body should be buried at once. Although a dreadful storm was raging, burial was made before morning. It is said, however, that the rain washed some of the cosmetics from the face of the dead boy and that the attendants realized Nero's crime.

These were by no means the only cases of poisoning at the courts of the Roman emperors. Livia, the wife of Augustus, was strongly suspected of having poisoned Marcellus, the son of Octavia, and finally of having hastened the death of the Emperor himself to secure the succession for her son Tiberius. Tiberius, true to form, is believed to have poisoned his nephew Germanicus. The motive here was jealousy for Germanicus had won three campaigns in the North and had been awarded a triumphal entry into Rome.

Caligula, too, is said to have dabbled somewhat in poisons. A chest of drugs was found after his death which, on being thrown into the sea, killed an abundance of fish.

Locusta outlived her patron, Nero, but received her just deserts, execution, under the succeeding emperor, Galba. Later a poisoner by the name of Canidia became prominent in the royal service.

There is little information available on the actual nature of the poisons used during the Roman republic and empire. It is certain that besides the two sulfids of arsenic, arsenious acid itself was known. It is most likely, however, that vegetable poisons were more commonly used. Juvenal, Martial, and Tacitus use the word aconite which, however, is known to stand for any poisonous plant. Pliny states that opium was used in suicide and cites the death of Coccina. Carbo, B. C. 119, is said to have committed suicide with cantharides and his brother used vitriol. The first case of carbon monoxide poisoning was that of the Emperor Jovian A. D. 364. Mushrooms are often referred to in the literature of the time. Domitan used these to poison his father, Vespasian, and his brother Titus. Rings with receptacles in which poison might be carried were known at an early date, and there were reported to be needles that would kill from a single scratch.

From the fall of the Roman Empire to the Renaissance the armamentarium of the poisoner was only slightly extended. The use of white arsenic became somewhat more general and corrosive sublimate was introduced probably by the Arabian alchemists. There were, however, many poisonings during these dark ages. Of the eighty-three emperors of the East from Valens to Constantine XII, seven were poisoned. Nine of the successors of Charlemagne died of poison and up to 1471 five popes had perished in the same way.

Rhazes, 932, in the eighth book of his Almansor treats of poisons and antidotes. He describes $HgCl_2$ and states that liquid mercury was non-poisonous to a monkey. Avicenna, 980-1037, wrote at length on poisons and their antidotes. His own death was due to mithridatic which had an excess of opium. Seropion, 1070, describes nux vomica but does not give its tetanic action. He gives a description of the calculi from the alimentary tract of the herbivora, the bezoars, which were supposed to have such magical powers against poisons. The use of these magical stones has persisted to our own times. Poisonings were so frequent in the twelfth century that Maimonides gives the following general advice:

Avoid all foods that exhale bad odor, for example onions . . . for it is in such dishes that poisoners conceal their artifices; because it is in such dishes that color, odor or consistency of the poison is easily concealed. Be on guard against those cooked with garlic and those having an acid taste, or styptic, or indeed excessively sweet. Be careful of wine, for it is a liquid that easily conceals the odor, color, and taste of poison, and especially because it facilitates its arrival at the heart.

Maimonides, as might be supposed, recommends a theriac as antidote. This electuary was composed in part of aromatics, opium, and powdered emeralds.

An authentic incident of 1384 illustrates some of the poisoning customs of the times. In that year, Charles the Bad of Navarre sent a minstrel, Noudretton, to the court of France to poison Charles VI, the Duke of Valois his brother, and his uncles the dukes, Berry, Bourgoyne and Bourbon. Explicit instructions were given.

You will do thus: There is a substance called arsenic sublimate. If one eats as much of it as a pea he will never live. You will find it at Pampelune, Bordeaux, Bayonne, in all the good towns you pass through, at the apothecaries. Get some and powder it. Station yourself near the kitchen, sideboard, or some other convenient place, and put some of this powder in their food or drink.

We are glad to relate that this diabolical scheme did not succeed. Noudretton was captured and quartered at the Place de Greve.

With the dawn of the Renaissance, poisoning became even more common and it was practiced by states as well as by individuals. During the fifteenth century no less than fourteen editions of Abano's famous De Venenis were published, the rarity of all of which speaks for their hard and continual use. No one believed in the natural death of princes, kings or cardinals. They were either poisoned or poniarded. A list of these murders sounds like an Almanac de Gotha. Everything was poisoned; food, wine, cups, tapers, clothing, even the lips of the king's mistress.

That political poisonings were considered quite legitimate is shown by the secret archives of the Venetian Council of Ten. The following are a few examples and after certain of them was placed the significant word factum.

May 24, 1419. The Council agrees to a proposition of Michaletus Mundacio to poison Sigismund, King of Hungary, for a specific reward, poison to be furnished for that purpose.

September 23, 1419. Archbishop of Trebizond offers to procure death of Marselius of Canova. Offer accepted and fifty ducats paid and a horse ordered.

December 2, 1450. Received a poison consisting of balls which when thrown into the fire, kill by their odor. Poisoning of Count Sforza considered. Poison to be tested on a criminal condemned to death.

January 14, 1478. Accepts offer of one, Lazarus, to poison wells from which Turkish Army takes its water.

May 12, 1568. Destruction of a wounded prisoner ordered by application of poison to his wounds.

December 16, 1755. The Council finds that the poisons are in great disorder and orders the inquisitors to put them in safe and serviceable condition.

Three recipes for poison preserved as secreta secretissima are found in the archives under dates of 1540-44. One of these shows that the chief substances used were corrosive sublimate, white arsenic, arsenic trisulfid and arsenic trichlorid.

Among the most notable and notorious of poisoners in Italy during the Middle Ages were the Borgias, Pope Alexander VI, and his son Cesare. They are said to have had a poison which would kill at any desired time, in a day or a year. A writer in describing them says:

Infamous poisons which render the wine better. You think yourself drunk and you are dead. Someone falls suddenly with languor, his skin wrinkles, his eyes become hollow, his teeth break like glass on bread, his cheeks pale, he walks no more, he drags himself, he does not breathe, he rales, he neither laughs nor sleeps. He shivers even in the sun. Though young, he has the air of an old man. He agonizes for a time. Finally he dies. He dies and then one remembers that a month, six months, or a year ago he had a glass of wine with a Borgia.

The "Gift of the Borgia" was a mixture of arsenic and ptomains called "cantarella" and it was believed to have been made as follows: A hog was killed with arsenic. Its abdomen was opened and sprinkled with more of the same drug. The animal was then allowed to putrefy. The liquor which trickled from the decaying carcass was collected and evaporated to a powder. It is needless to say it was extremely poisonous.

One of the best known poisonings carried out by Alexander VI was that of Zizin, son of Mahomet II. The Sultan paid the pope 300,000 ducats for the work of art. The Borgias specialized, however, on bishops and cardinals. The pope would appoint a cardinal and allow him to increase his wealth by perquisites from the church. Then he would be invited to a meal. He would soon die and his property reverted to the Holy See. Finally the game was played once too often. In 1503 on a certain occasion at which some cardinals were to receive the usual refreshment, the pope and Cesare returned home before the banquet and called for some wine. The servant gave them by mistake from the poisoned vessel. The pope died but his son escaped by means of a most remarkable antidote. Many old writings mention that if one can enter the body of an animal, he will escape the effects of poison. Remembering this, Cesare had a mule killed and having cleaned out the abdomen he covered himself with the carcass. His recovery is ample proof of the efficacy of the method.

One of the most famous of all Italian poisons was the Aqua Tofana. A great mass of writing exists about this solution and its venders. The most bizarre stories regarding the origin of the Aqua were current. By many it was supposed to be the condensed sweat and foam from tortured men. A few drops would kill at a future appointed time. The victim would lie down, rosy and fresh in sleep and never waken. With the exception that it would kill, all this was fable. The facts, as near as they can now be ascertained, were these.

In 1633 during the rule of Vice-King Ferdinand in Sicily, a woman Teofania was executed because she sold a death-giving water in Palermo and vicinity. In 1640 there appeared in Rome a Giulia Tofana who came from Palermo. Whether or not this woman was a daughter of the first is not clear, but she was at least her spiritual heir. She gathered about her a number of accomplices and appears to have escaped the gallows, dying a natural death in 1651. She is credited with over 600 successful poisonings. Her companion Guolema Spara and four other female helpers were hanged in 1659, and their accomplices whipped through the streets. The pope had the records of the case preserved in the Vatican to preserve secrecy. Spara disposed of her poison in small vials labeled "Manna of St. Nicholas of Bari." In 1730, there was a third Tofana in Naples but of her little is known.

The composition of the Aqua Tofana has aroused much speculation. Some thought it was cantharides and opium, but that is inconsistent with the statement that it was clear, limpid and tasteless. The best evidence is that it was a solution of arsenic trioxid. The legal papers of 1659 state that the poison was arsenic and it has been discovered that in 1633 immediately after the execution of the first Tofana, a law was promulgated at Palermo governing the sale of this drug.

Poisoning as an art and a profession came to France with Catherine de Medici, the Italian bride of Henry II. With her also came the dread Florentines, Rene Bianco and Cosme Ruggieri. Rene opened a perfumer's shop in the pont St. Michael. Ruggieri was an astrologer and became the oracle of the court. Both of them were adepts at preparing poisons. Catherine came from a court and a family that had frequently used poison for political and private reasons. Cosmos I, patron of arts and letters as he was, had a chemical laboratory in his palace. The poisons there prepared he tested on animals and repeatedly used on people. Catherine is usually credited with having disposed of Jeanne d' Albret, Queen of Navarre, the Cardinal of Lorraine, Coffé, a marshal of France, and the Duc d'Anjou. The court of France was the image of that of the Borgia, and death was the friend of the Queen.

The number of those devoting themselves to the black arts in France during the sixteenth and seventeenth centuries is almost unbelievable. In 1572 there were 30,000 sorcerers in Paris, most of whom dealt quite openly in poisons, love philters and abortifacients. The works of Porta and Cardan popularized the knowledge of poisons, both mineral and vegetable. There were secrets for poisoning gloves and clothing. Books were soaked in deadly drugs and became fatal to the reader. Knives were so skillfully drugged that on cutting a peach one side only was poisoned, the other being eaten by the murderer to allay all suspicion. The vapors of candles brought speedy death. Cups were prepared which added poison to any liquid they might contain. Love philters and vials of death were in every vanity box. Pins were there, a scratch from which sent one into eternity. There were mirrors even which reflected death. Rings were made with secret receptacles, and one is preserved that on the palm side has attached a small syringe, by means of which a poison could be injected into food or drinks. Poisoning was the fashion. Thousands stood ready for a price to commit a quiet murder. Death stalked in a thousand unknown forms. Most of the methods mentioned existed only in people's imagination. Modern science, with its knowledge of toxalbumins and war gases might possibly be able to duplicate some of the fancies of the sixteenth and seventeenth centuries, but a majority of the stories can hardly be taken at face value. It must be remembered, however, that the people of that day were extremely superstitious, and the cases of undoubted poisoning were quite frequent enough to take away all sense of security. When Henry IV came into Paris from Navarre, he ate only eggs which he himself fried, and drank only water which he drew from the Seine with his own hands.

Many of the dietetic habits of the time were quite favorable to the poisoner. Bread was baked in round cakes which served as trenchers. On these were placed the meat and vegetables and the trenchers themselves were then eaten for dessert. There were many forms of wines and ales, but all were heavily spiced and turbid. The clear products of the present time were unknown. Service was in metal cups, glass being practically unknown. Rabelais speaks of 70 different recipes for soups, all charged with pimento or pepper. But a still greater safeguard for the poisoner was the absence of any qualitative or quantitative methods for the detection of poisons. Unless the murderer was seen to add something to the food, nothing could be proved. Every sudden death aroused suspicion. Science, or rather alchemy, from which chemical science sprung, had developed poisons but had learned to control none. So serious was the situation that men of affairs urged Ambrose Paré to devote his energies to searching for antidotes. He wrote a book on Les Venins, a chapter of which he devoted to counter poisons, but although he railed at physicians who bled the patients white, he had nothing better to offer than theriac in malvoisie wine. It was at this time that the bezoars, those concretions from the alimentary canal or herbivora were greatly in vogue. Paré demonstrated their uselessness in a tragic event not of his own planning. At Clermont, Charles IX received a bezoar solution from Spain, and was much impressed with the extravagant

claims made by the bearer. Paré denied the efficacy of the solution vehemently. To settle the quarrel the King proposed that a criminal condemned to death be brought and given both poison and the antidote. The poor wretch was to be pardoned in case of his recovery. It was done as ordered, but a horrible scene resulted. The man rolled and writhed in agony for seven hours and then expired. The rest of the antidote was thrown in the fire.

By 1679 poisonings were so common in France that a special judicial commission the "Chambre Ardente" was appointed to take care of the cases. In the three years of its existence it investigated 442 cases of which the charge was sustained in 218. Gradually the people began to look on poisoning even as one of the ordinary hazards of life. Losers in the game, provided they recovered, made no outcry. The proper thing was to be a good sport. It was comparable to dueling. When Madame de Dreux, who was in love with Richelieu tried to poison her husband and her lover's wife, the indiscretion was found to be "divinely diverting." The criminal was too pretty to be hung so she was let off by the judges with a friendly warning. Madame de Bouillon determined to poison her husband so that she might marry the Duke de Vendome. The whole court knew of the attempt, but nothing could persuade the husband to outrage the proprieties. On being called to court he took his wife's right hand, the Duke de Vendome took her left. Thus supported she faced her judges. When the president of the court asked her if she had seen the devil at the sorcerer's house she replied, "O, no, but I see him now. He is old, ugly, and disguised as a councilor of state." Paris went wild at the witty remarks.

One of the most famous cases of poisoning in the seventeenth century was that of the Marquise de Brinvilliers. The story is a sordid one and the nauseating details may be passed lightly. The Marquise was a girl beautiful of person but mentally most likely a high grade moron. She married a Gobelin, a son of the famous tapestry maker, but formed an attachment to a certain Captain Sainte-Croix. Her father being a gentleman of the old school and disapproving of loose morals had the lover put in the Bastile. Here Sainte-Croix is said to have learned the art of poisoning from the famous Exili. He had, too, in the past been a student of Glaser, a famous chemist the discoverer of potassium sulphate, long called Glaser's salt. At any rate when Sainte-Croix was finally freed he had many recipes for poisoning at his disposal and these he transmitted to his mistress. She tested them in a manner at least unique. In the name of charity and religion, she secured access to the hospitals. It was finally noted that those she visited and gave sweet meats to, often grew worse and many died. It was not until later, however, that her diabolical actions were understood. To gain possession of the family property, a necessity for the continuance of her dissolute life, she poisoned her father, two brothers and a sister. Sainte-Croix her lover, perished in his laboratory from some poisonous fumes that penetrated his mask. On looking through his papers, evidence was found that proved the guilt of his mistress. She was arrested, convicted, and condemned to be beheaded, her body burned and the ashes thrown to the wind.

Among other well known cases of the time was that of La Voisin, an arch poisoner, abortionist, and sorceress. She ran a great establishment with an income of some hundred thousand francs a year. She confessed to having murdered some 2,500 infants, many of whom were sacrificed during various occult rites. She performed the "black mass" repeatedly. At last she was arrested and condemned. When in 1680 the investigation of her crimes began to involve the court, particularly the King's mistress, Madame Montespan, Louis XIV summarily abolished the Chambre Ardente. The horrible details, however, actually aroused public opinion and La Voisin was the last of the "poisoners for hire," at least the last who attained any eminence. This desirable result was also due in large part to the edict of 1682, which closely regulated the sale of poison and placed the ban on "poisoners, deviners, and others." The law was broad and vague enough that the underworld at last took fear and their nefarious business began to wane. With the eighteenth century poisoning became sporadic much as one finds it today.

Two other cases of the sixteenth and seventeenth centuries which have been discussed a great deal in history may be mentioned briefly, namely the deaths of Charles IX of France and the Duchess of Orleans, Henrietta of England. Charles was the third son of Henry II and Catherine de Medici. He died under suspicious circumstances after having reigned thirteen years during which he blackened his reputation forever by the massacre of St. Bartholomew. His illness was long. There was great abdominal pain, much vomiting, and spitting of blood. Toward the end his body sweat blood and drops of it fell from his fingers. It is small wonder that such symptoms should provoke all kinds of surmises. Some believed he was being punished by God for the massacre. Others saw it as a case of slow poisoning and this idea grew so prevalent in the court that two of the King's gentlemen, Le Mole and Cocionas, were executed. This incident is made much of by Dumas in one of his novels. Fortunately an autopsy of the king was made, for the most part by Ambrose Paré. The protocol of this postmortem has been carefully studied in recent years. It seems clear that the king died of pulmonary tuberculosis. The cutaneous bleeding which so startled the courtiers was doubtless a complicating purpura hemorrhagica by no means unknown in such conditions.

Henrietta of England, sister of Charles I of England, and wife of the Duke of Orleans, is also popularly supposed to have been poisoned. She died suddenly after great gastric pain and vomiting of blood. The letters of Guy Patin, dean of the Medical Faculty of Paris, throw much light on this case. The Duchess had long been treated for stomach trouble. Littre has in recent years gone into the details carefully and has shown conclusively that "Madame" really died of a perforating gastric ulcer.

It is hard to tell the exact poison used in any given case during the sixteenth and seventeenth centuries. The symptoms were always confusing and with the absence of analytical methods, everything was in confusion. There could be no toxicology without chemistry, yet Zacchias, Cardan, Porta, Abano and Paré had treatises on poisons. Paré's views, which reflect the knowledge of the time, were somewhat as follows:

> Poison is a substance which has power to combat and conquer the human body. Food connects itself into blood and nourishes the parts of the body; poison, on the contrary, adds itself to the excretions and so dissolves and consumes the whole body. Furthermore, it transmits the body and particularly the members that it touches into rank poisons.

Paré divided poison into two classes:

1. Those that operate by virtue of their elementary qualities. 2. Those that have specific, occult, qualities. These latter have their power from heaven, such as the torpedo first, which paralyzes the arms, the sea-hare that consumes the lungs, and cantharides which attack the liver.

The first class was divided into four sub-classes: 1. The hot, such as arsenic which provokes intestinal inflammation. 2. The cold, such as opium which brings on coma. 3. The dry, such as lead and antimony. These are almost all cold too. 4. The wet, such as snake venom, anthrax and plague.

Although, as has been said, the poison used in a given case was always doubtful during the Middle Ages, we do know the drugs in most general use. Arsenic was the king of poisons. Its use dates back to antiquity. Towards the end of the Renaissance it was well known and available to all classes of society. It was the base of nearly all the Italian concoctions. The common form was white arsenic As_2O_3, commonly called sublimed arsenic. The sulphids, realgar and orpiment, were known as well, but their color and insolubility made them harder to disguise. Letharge, lead acetate, and lead carbonate were occasionally employed. Copper acetate has been reported occasionally. Among the vegetable poisons aconite seems to have been the most commonly used. Opium, belladonna, mandrake, hyoscyamin, and hemlock were known and used at times. Among the animal poisons the only one of any importance was cantharides. Most of the poisonings by this agent were accidental and occurred in its use as an aphrodisiac.

During the eighteenth century, poisoning lost most of its glamour and romance and became more and more recognized as cowardly murder. With the discovery of a chemical test for arsenic by Marsh in 1846, the old days of the art of poisoning were dead, never to be revived.

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MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Aseptic Meningitis: Isolation of Coxsackie and Unidentified Cytopathogenic Viruses from Cerebrospinal Fluid by Tissue Culture Methods. D. Duncan, A. J. Rhodes, G. A. McNaughton and others. Canad. J. Pub. Health **46:**1-8 (Jan.) 1955 [Toronto, Canada].

Cerebrospinal fluid specimens from 52 patients with a diagnosis of "aseptic meningitis probable non-paralytic poliomyelitis" were collected in 1952 and were stored in a carbon dioxide "dry-ice" box until 1954 when they were used for the inoculation of trypsinized monolayer cultures of kidney epithelium obtained from rhesus monkeys. Only five of the cerebrospinal fluids yielded cytopathogenic agents. Three of the five were identified as group B Coxsackie viruses; the other two remained unidentified at present, but fell into the general category of "orphan" viruses. Convalescent phase serums were available from all five patients from whose cerebrospinal fluid cytopathogenic agents were isolated. Serologic tests that were performed on these serums showed that in all of the three patients whose spinal fluid yielded group B Coxsackie virus increases in antibody to the homologous strain occurred in convalescence. A definite rise in homologous antibody occurred in the serums of both the patients from whose cerebrospinal fluid unidentified cytopathogenic agents were isolated. There was no evidence from isolation or serologic tests that the patients from whose cerebrospinal fluid viruses were isolated were concurrently infected with poliomyelitis virus. These results suggest that the five patients had aseptic meningitis caused by group B Coxsackie virus or the unidentified cytopathogenic agent. The clinical features of the five patients concerned were those of benign aseptic meningitis and not specific.

Digitalis Therapy and Digitalis Intoxication. R. M. Denham. J. Kentucky M. A. **53:**209-216 (March) 1955 [Louisville, Ky.].

Congestive heart failure, regardless of its origin, is the primary indication for digitalis therapy. A trial of digitalis therapy is warranted in all cases of congestive heart failure, although in some instances of tight mitral stenosis or aortic stenosis it proves to be ineffective. It may be of little benefit in acute rheumatic carditis with heart failure. The presence of digitalis intoxication or full digitalization are contraindications to digitalis therapy. Many digitalis preparations are now available for clinical use. If rapid digitalization is to be done by the oral route, digitoxin is preferred to whole leaf preparations. For slow digitalization, whole leaf preparations may be used. If rapid intravenous digitalization is indicated lanatoside C, digoxin, and gitalin are effective. Ouabain has been recommended for rapid intravenous digitalization. The physician should become familiar with two or three preparations for oral administration and one preparation for parenteral administration for emergencies. There is no "average" dose of any preparation that will digitalize or maintain every patient. Each patient must be managed on a trial and error basis by careful observation. Gitalin has a definite advantage in its wider margin of safety between the therapeutic and toxic dose. This makes it desirable as a preparation for use in advanced heart disease with congestive failure. The incidence of digitalis intoxication is rising. Many attribute this to the increased use of digitoxin. If full digitalization is accomplished in each patient treated, a high incidence of minor intoxication is likely to occur. The margin of safety between therapy and intoxication in advanced heart failure becomes very narrow. Vigorous diuresis of a patient only slightly overdigitalized may result in a full-blown toxic condition with serious or even a fatal cardiac arrhythmia. There is evidence that gitalin may offer a wider margin of safety both for digitalization and maintenance than other preparations. Milder degrees of digitalis intoxication improve by simple withdrawal of the drug in from one to three days. In the more severe states of intoxication, especially with tachycardia or other arrhythmias, the drug must be stopped, but other measures are also indicated. No diuretic should be administered because of the accompanying diuresis of potassium, which in turn enhances digitalis effect. The administration of potassium salts either parenterally or orally is suggested. Quinidine or Pronestyl may be effective in the ventricular arrhythmias. Atropin sulfate may be helpful if the vagal effects of digitalis seem to predominate. The patient should be encouraged to take 2 or 3 liters of fluid daily by mouth if possible. Illustrative clinical histories are presented, including two cases of paroxysmal auricular tachycardia with block due to digitalis intoxication.

Cardiovascular Effects of Smoking of Tobacco on Normal Persons and Patients with Hypertension. G. M. Roth and R. M. Shick. Pennsylvania M. J. **58:**281-283 (March) 1955 [Harrisburg, Pa.].

Roth and Shick made their tests at the Mayo Clinic in a room with a constant temperature of 25.5 C (78 F) and a relative humidity of 40%. The subjects fasted for 15 hours before each test. During the test they wore pajamas and were in a supine position on comfortable beds. All noise and other stimuli likely to cause vasoconstriction were excluded during the tests. The temperatures of the plantar surfaces of both first and third toes and the volar sides of the distal phalanges of both first and third fingers were measured at intervals of 10 minutes with thermocouples. When the skin temperature, blood pressure, and pulse rate were fairly well stabilized, smoking was begun. The subjects smoked two cigarettes in succession until two-thirds of each had been smoked. They inhaled the tobacco smoke with the depth and frequency to which they were accustomed. The blood pressure, pulse rate, and skin temperature were determined simultaneously at intervals of one minute during the smoking, which generally lasted 12 to 16 minutes, and for 30 to 60 minutes after smoking had ceased. In order to determine whether the results of smoking tests made on the same individual from day to day are consistent and whether habitual smokers become so tolerant to tobacco that they do not respond to smoking by vascular or physiological change, subjects who were habitual smokers and inhaled the smoke were tested. The smoking of cigarettes of corn silk (controls) caused little or no change in skin temperature, blood pressure, pulse rate, and electrocardiographic tracings. Habitual smokers did not show tolerance to the effects of smoking as the skin temperature of the extremities decreased and blood pressure and pulse rate increased during smoking of two standard cigarettes. The decrease of the skin temperature was not related to the length of time the subject had been a smoker or the number of cigarettes smoked daily. Nicotine has a most important role in production of the vascular changes that accompany smoking. Apparently the content of nicotine in a cigarette must be decreased more than 60% from that in a standard cigarette before smoking produces only slight or no vascular effects. Since alcohol dilates blood vessels and smoking constricts them, studies were made to ascertain whether the oral administration of 95% ethyl alcohol would prevent the constriction of the peripheral blood vessels known to be produced by the smoking of tobacco. Observations were made on 65 healthy persons, ranging in age from 19 to 59 years. The results of this study did not substantiate the common belief

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that drinking a cocktail nullifies the effect of smoking. To ascertain the effect of smoking on hypertension, smoking tests with standard cigarettes were made on 26 patients with labile blood pressure and on 16 with hypertension. The impression was gained that the hypertensive patient would do well to give up smoking.

Muscular Exercise in the Treatment of Bronchial Asthma: Technic and Physiologic Basis. K. Schutz. New York J. Med. **55**:635-643 (March 1) 1955 [New York].

An exercise program, consisting of education to physiological respiration and graded muscular exercises, was used in the treatment of 23 patients with bronchial asthma. Good results were obtained in 10 patients and improvement in 9 others. Improvement was evaluated by cessation or marked decrease in number and severity of asthmatic attacks, an increase in the excursion of the diaphragm, and an increase in the vital capacity. Fluoroscopic and roentgenographic methods of recording diaphragmatic excursions were used. In addition to the favorable influence of respiratory reeducation, the beneficial effect of the described exercise therapy in bronchial asthma can be attributed mainly to stimulation of the adrenal cortex to increased cortisone production. The classic studies of Selye dealing with the general adaptation syndrome and the work of Richter on relation of domestication to the size of the adrenal glands in rats strongly support this opinion. The favorable physiological and psychosomatic reactions due to training contribute to the very good results of this constitutional therapy.

Present-Day Treatment of Esophageal Burns. A. J. Van den Ostende. Belg. tijdschr. geneesk. **11**:80-85 (Jan. 15) 1955 (In Flemish) [Leuven, Belgium].

The aim of this report by Van den Ostende is to show that the esophageal strictures that result from the swallowing of corrosive substances can now be largely prevented by treatment with cortisone. He presents the case of a man, who, after drinking soap lye (alkaline liquor) by mistake, showed the symptoms of a severe caustic alkali burn. Lips, tongue, palate, and pharynx were swollen and red, and ulcerated areas were visible here and there; although the patient had taken some milk immediately after the accident, he was now unable to swallow. Morphine, penicillin, and streptomycin were administered, and, on the following day, the mucosae were red and showed superficial ulceration. Breathing was not impaired; a stomach tube was inserted through the nose, and water and milk were given. Cortisone treatment was started at once. For three days, the patient was given twice daily an intramuscular injection of 100 mg. of cortisone and then daily 100 mg. for three weeks. After that cortisone therapy was continued with oral doses, first four times daily 25 mg. for a week, then twice daily for a week, and after that once daily 25 mg. Treatment with penicillin and streptomycin was also continued. Esophagoscopic examination five weeks after the accident showed a normal mucosa and roentgenography also revealed a normal esophagus. Administration of cortisone to prevent stricture formation following esophageal burns has a rational basis. It prevents the fibroplasia that is the essential factor in the formation of the esophageal strictures. Since the migration of fibroblasts begins on the third or fourth day, it is highly important that treatment with cortisone be started as early as possible. Gradual decrease in the cortisone dosage is essential in order to avoid secondary hypoadrenocorticalism. It is also advisable to give potassium chloride by mouth daily to counteract the cortisone-induced loss of potassium.

Tuberculous Pleural Effusions Treated with Streptomycin, Para-Aminosalicylic Acid, and Early Aspiration. P. A. Emerson. Quart. J. Med. **24**:61-76 (Jan.) 1955 [Oxford, England].

The results of treatment of a control group of 40 patients with tuberculous pleural effusions treated with adequate rest in bed are compared with the results obtained in a group of 25 comparable patients also treated with adequate rest but in addition given streptomycin and *p*-aminosalicylic acid. Nineteen of the 25 patients in the group treated with streptomycin were also subjected to early therapeutic aspiration. Pyrexia persisted for an average of 22 days in the group treated with streptomycin, as compared with 45 days in the control group. There was no difference in the duration of the raised erythrocyte sedimentation rate in the two groups, and no conclusions can be drawn about the effect of the treatment on the duration of the effusion. After a follow-up for at least two years, active tuberculosis had developed in 9 of 40 in the control group but in only 1 of 21 in the group treated with streptomycin. Active tuberculosis developed during a follow-up period of two years in 9 of 32 patients of the control group in whom the pulmonary parenchyma was originally clear and in none of the 17 treated with streptomycin. The practice of carrying out early aspiration was discontinued after it had been done in 19 patients because, after such early therapeutic aspiration in the pyrexial phase of the illness, the fluid usually recurred, the erythrocyte sedimentation rate was invariably accelerated, and the temperature sometimes increased. The shortening of the pyrexial period and the lowered incidence of subsequent tuberculosis in the group treated with streptomycin are due to the antibacterial therapy and not to the early therapeutic aspirations. All patients with a tuberculous pleural effusion should be given the benefit of antibacterial therapy.

Central Nervous System Complications During Isoniazid Treatment of Pulmonary Tuberculosis. M. M. Wood. Brit. J. Tuberc. **49**:20-29 (Jan.) 1955 [London, England].

Wood suggests that interference with the action of a drug by a structurally related analogue may explain why patients treated with isonicotinic acid hydrazide (Isoniazid) may develop manifestations of nicotinic acid deficiency. At his hospital confusional psychosis developed during isoniazid therapy in four patients. In a fifth patient with mental disturbances isoniazid may have been a factor. The author also presents 13 patients who had pellagra when they were admitted and who subsequently were given isoniazid. Two other patients had peripheral neuritis. All 20 cases concerned Bantu patients with pulmonary tuberculosis. Most of them received daily 400 mg. of isoniazid and 30 grains (2 gm.) of yeast. In 4 of the 13 patients with pellagra, isoniazid therapy did not interfere with the cure of pellagra; in 5, healing required longer periods while isoniazid was continued; in three the pellagra did not heal until after isoniazid was discontinued; and, in one, who did not have classical pellagra, the lesions had not healed after two months. The confusional states may possibly be regarded as part of the pellagra syndrome, although only one patient had other manifestations of avitaminosis B. The five patients had in common a state of confusion, with disorientation, loss of memory, delusions, hallucinations, and mania in varying degrees. It appears that most patients with pellagra cannot be treated satisfactorily on a good diet, even with supplements, if isoniazid is given concurrently, but once a patient is "saturated" with nicotinic acid, he is less susceptible to the toxic effects of isoniazid. If treatment with isoniazid is to be continued, a "maintenance" dose of nicotinic acid should be given.

Kathepsin and Pepsin After Gastric Resection and Gastrectomy. H. G. Pfisterer. Arch. klin. Chir. **280**:123-142 (No. 2) 1955 (In German) [Berlin, Germany].

The gastric proteolysis by kathepsin and pepsin was studied in 10 healthy persons and in 169 patients who underwent operations on the stomach. Forty patients with gastric ulcers were studied before the resection of the antrum and 18 to 22 days after this surgical intervention. Eighty patients were studied 5 to 12 years after the resection of the antrum; 18 patients were studied after resection of one-half or two-thirds of the stomach and 14 after subtotal resection with preservation of the upper portion of the stomach; 6 were studied after esophagoantrostomy with preservation of the lower portion of the stomach and 11 after total gastrectomy. Kathepsin was demonstrated in small residual portions of the stomach and also in the duedonum. With its wide spectrum of action it always exerts more or less proteolytic activity in the stomach operated on. The action of kathepsin does not seem to be extinguished even after removal of the entire stomach and in the absence of any action of pepsin. Twenty days after gastric resection pepsin suffered a decrease equal to the drop in free hydrochloric acid; at this time the kathepsin still showed "normal" activity. The physiologically

constant ratio of 10 to 8 of the katheptic to the peptic digestive units was increased in favor of the kathepsins. Five and more years after the resection a characteristic ferment level developed in patients who were free of complaints; they presented a permanent state of physiological adjustment, with a drop in kathepsin activity to lower values, but still more prominent than that of pepsin, and corresponding to conditions that warrant a satisfactory proteolysis by kathepsin. The reduction of the normal activity of kathepsin hardly amounted to 20%. The deficiency in "free" hydrochloric acid was inversely proportional to the kathepsin values. High total acidity means high ferment values, also for pepsin. In the few patients with limited action of kathepsin and pepsin, reflux of bile was observed in the area of the anastomosis; the proteolysis that had been initiated by kathepsin had been taken over compensatorily by trypsin. Obvious differences could be recognized in the ferment activity after resection of one-half or two-thirds of the stomach and after subtotal gastric resection, depending on whether the resection was done for ulcer or for carcinoma. The stomach of patients subjected to resection for a "high" ulcer or an ulcer near the cardia showed stronger ferment values than the stomach of patients who underwent resection for carcinoma. A continuous drop in peptic and katheptic proteolysis was definitely noted corresponding to the size of the portion of the stomach that had been resected toward the cardia. Here too the kathepsin showed a slow and gradual drop as compared with pepsin, which did not display any activity in the subtotal stomach. In contrast to these findings, the esophagoantrostomies showed a different ferment aspect. The pepsin-kathepsin ratio again was approximately equal and the total acidity almost normal, but the resulting values of proteolysis were lower than after the resection of the antrum. The portion of the stomach near the pylorus seems to be of greater importance with regard to the coordination of the various fermental influences on the protein substrate than the portions of the stomach that are situated higher up, although the special peptic-katheptic proteolysis is not reduced to a greater extent by the removal of the antrum than by that of the cardia and the body of the stomach. The fermental aspect of total gastrectomies holds a unique position in that, despite the complete absence of gastric mucosa, a slight kathepsin proteolysis was observed in 3 of 12 patients who had undergone either esophagoduodenostomy or esophagojejunostomy for carcinoma. Resection of the antrum as method of treatment for gastroduodenal ulcers excels in proved satisfactory proteolysis of proteins. The digestive mechanism has such compensatory capability that even a partial deficiency of the components of digestion does not result in a break down of the proteolysis of proteins. Determination of the enzymatic digestive capability of the gastric juice, as well as that of the acid curves, should be included in the methods of clinical investigation.

Low-Fat Diet and Therapeutic Doses of Insulin in Diabetes Mellitus. I. Singh. Lancet **1**:422-425 (Feb. 26) 1955 [London, England].

According to Singh there is no indication that healthy people taking a diet rich in carbohydrates are especially liable to diabetes mellitus. It is not especially common among the mainly carbohydrate-eating populations of the world, for instance, the Chinese, except among the rich and the sedentary who partake of large quantities of fat as well as encourage obesity by overeating. That even diabetics tolerate a diet high in carbohydrate has been demonstrated in many reports. Since investigators confirmed that a high-carbohydrate diet increases sugar tolerance whereas a high-fat diet decreases it, the tendency has been to abandon high-fat, low-carbohydrate diets in the treatment of diabetes and to give a diet containing a normal or a practically smaller than normal amount of fat, a normal amount of carbohydrate, and a normal amount of protein with adequate insulin. The author presents observations on 80 insulin-sensitive diabetics. One patient was a child, aged 13; the others were adults, mostly of the age groups between 26 and 58 years. Ketonuria was found in 14 and glycosuria alone in 66; 23 apparently had no symptoms; and, of the remaining 57 patients, 2 were found to be semicomatose and 55 complained of symptoms ranging from weakness to all the classical symptoms of diabetes mellitus. The patients were treated with low-fat optimal caloric diets containing 20 to 30 gm. of fat, 120 to 150 gm. of protein, and the rest carbohydrate and progressively diminishing therapeutic doses of insulin. Fifty of the 80 patients became sugar-free in 3 to 6 weeks and did not require any more insulin, and 14 showed slight irregular glycosuria on some days and not on others, which could be controlled adequately with 10 units of protamine-zinc insulin. Of these 14 patients 8 improved subsequently and did not require any insulin after 18 weeks, and the remaining 6 continued to show irregular glycosuria. The six patients with severe diabetes, who initially required 80 to 120 units of protamine-zinc insulin, could be controlled at the end of six weeks with 20 to 40 units. All these patients have been followed up on diet alone for from six months to five years. Serial glucose-tolerance tests were done for from 18 to 26 months on seven patients; five of them are apparently cured, and they now take fat more liberally, but it is limited to 50 to 60 gm. daily. The remaining two patients have glucose-tolerance curves suggesting very mild diabetes. Ten patients who had become sugar-free on diet alone showed increased carbohydrate tolerance.

Thyroid Combined with Thiourea Derivatives in Treatment of Endocrine Exophthalmos. P. Del Maschio. Minerva med. **45**:1576-1584 (Dec. 2) 1954 (In Italian) [Turin, Italy].

The administration of thyroid extract combined with that of thiouracil gave good results in four patients with endocrine exophthalmos. This was secondary to the administration of thiourea derivatives for thyrotoxicosis. While that therapy benefited the thyrotoxicosis, it inhibited the synthesis of the thyroid hormone and a further formation of it. This chemical thyroidectomy caused in time an increased production of the exophthalmos-inducing thyroid-stimulating hormone of the pituitary that became manifest with the protrusion of the patients' eyeball. Because the use of thyroid or thyroxin might have caused a return to the former thyrotoxicosis, the patients were given a dry thyroid extract to counteract the thyroid-stimulating hormone of the pituitary and thiouracil to counteract the influence of the thyroid gland. Before the institution of this combined therapy in patients with exophthalmos, it is essential that the basal metabolism be as near normal as possible. This is best achieved by administering large daily doses of thiourea derivatives. At the same time the white blood cell count should be checked carefully to prevent granulopenia or agranulocytosis. The combined therapy should be instituted as early as possible to prevent irreversible changes of the eye muscles. The thyroid extract should be given at first in small doses, which can be increased if the drug does not cause tachycardia, heart-palpitation, insomnia, and agitation. The therapy should be individualized, and the two drugs should always be given concurrently and for a prolonged time.

Arteriosclerosis Obliterans: I. Plethysmographic Studies of Peripheral Circulation Following Administration of Vasodilators. S. S. Samuels and M. Tuchman. Angiology **6**:1-27 (Feb.) 1955 [Baltimore].

The effect of five vasodilator drugs on the rate of blood flow to the extremities was tested by means of the electronic pneumoplethysmograph in 15 patients between the ages of 70 and 89 with arteriosclerosis obliterans. The Winsor apparatus was used throughout. The drugs tested were dioxylene (Paveril) phosphate, hydergine (a mixture of the three hydrogenated ergot alkaloids, dihydroergocornine, dihydroergocristine, and dihydroergokryptine), pentaerythritol (Peritrate) tetranitrate with nitroglycerine coating, azapetine (Ilidar) phosphate, and 3-pyridine-methanol (Roniacol). The drug was administered after 30 minutes of rest and the volume pulsation of the digit, the rate of blood flow estimated directly by the venous occlusion method, the skin temperature of the digit, peripheral resistance, digital volume pulsation ratio, potential blood flow, and pulsation blood flow ratio were determined. The "response" to the drugs tested was based primarily on the percentage increase of the rate of blood flow over the resting state ("potential blood flow"). Each of the vasodilating drugs tested showed a potentiality of producing definite increases in the rate of blood flow in the digits. No one of these drugs showed a greater effect on the rate of blood flow

than the other. Analysis of the results of the tests by a statistical consultant established the criteria for the "significant responses." These values were shown on the curves for the index finger and the toes of the patients tested. Extreme caution in the evaluation of the final results was exercised throughout, but it is felt that, contrary to the recognized inaccuracy and unreliability of subjective symptoms as criteria for the clinical effectiveness of various forms of therapy in peripheral arterial diseases, the plethysmographic method is extremely valuable in the purely objective study of the effect of such therapy.

Myleran in Chronic Myeloid Leukemia. D. A. G. Galton and M. Till. Lancet **1**:425-430 (Feb. 26) 1955 [London, England].

Myleran (1:4-dimethanesulfonyloxybutane) is an effective palliative in chronic myeloid leukemia. The authors record the effects of repeated courses of myleran and of maintenance therapy in chronic myeloid leukemia. The trial was started in September, 1950, and 31 patients, including the 19 already reported, had begun treatment by March, 1954. Administration is by tablets of 2 mg. and 0.5 mg. In August, 1951, the authors gave up the "short intensive" courses of treatment in which 100 to 150 mg. was given in one to six days, because severe bone-marrow depression, fatal in one case, occurred in three patients. The standard dose for adults has since been 0.06 mg. per kilogram of body weight daily (about 4 mg.). An initial loading dose of 20 mg. was used a few times but was found unnecessary. The first 20 patients received one or more courses of myleran. Eight died within a year of the only course, seven having received "short intensive" therapy. Eleven patients received one to three subsequent courses (0.06 mg. per kilogram of body weight daily); maintenance therapy (0.5 to 4.0 mg. daily) was eventually given to six of them. In 11 other patients maintenance therapy was given immediately after an initial period of standard dosage. Symptoms were rapidly relieved; the hemoglobin level rose steadily; splenic regression, though somewhat slower than with radiotherapy, was equal in extent; and absolute and differential leukocyte counts approached normal. There were no side-effects, and thrombocytopenia, formerly thought to be an occasional hazard, developed only once since doses exceeding 0.06 mg. per kilogram of body weight daily have been avoided. The immediate response to second courses was similar to the first response, but remissions following second and third courses of myleran were usually shorter. Patients receiving maintenance therapy were kept well for periods up to two years, but resistance, apparently specific, appeared in three cases. Although, on limited experience, myleran is a satisfactory substitute for radiotherapy, its chief advantage is its efficacy when radiotherapy has been of limited value or has ceased to be effective. Only 11 patients have been treated with myleran alone, 7 of whom are still living; only 2 have been observed for more than three years from diagnosis, which is about the median survival from diagnosis in patients treated by external radiation and with radioactive phosphorus. It is therefore too early to compare the survival rates of patients treated with myleran alone with those treated by radiotherapy alone. Until statistical analysis becomes practicable, myleran cannot be advocated as a first line treatment, although at present it appears to be a satisfactory substitute for radiotherapy and can justifiably be used as such if radiotherapy is unavailable, impracticable, or contraindicated.

Gaucher's Disease: General Study and Report of Cases. L. Sánchez Medal, A. Treviño V. and J. Gómez Paliza. Rev. invest. clín. **6**:417-434 (Oct.-Dec.) 1954 (In Spanish) [México, D. F., México].

Gaucher's disease (lipid histiocytosis of kerasin type) is extremely rare in Mexican Indians and in mestizos with predominant Indian blood. The subjects of this report are two mestizos with predominant Indian blood. Both patients were undernourished and underweight. The girl was seen at the age of 14 years, in 1935. The disease appeared when she was 4 years old, with asthenia, anorexia, anemia, progressive loss of weight, marked enlargement of the abdomen, and nasal hemorrhages. Continuous small nasal discharge of bloody mucosities would last for months. The discharge disappeared for several months after measles and again after smallpox. A sister three years younger died at the age of 7 years from the same disease. At the age of 14, the patient weighed 32 kg. and had a huge abdomen. She was given two blood transfusions of 150 cc. each in the preoperative period for a splenectomy. The operation was complicated because of the large number of blood vessels entering and leaving the structure. The removed spleen weighed 6,500 gm. The second patient, a boy 13 years old, was observed in June, 1952. The symptoms were the same as those observed in the girl, but he also had a large number of enlarged superficial axillary and cervical lymph nodes. Gaucher's cells were observed by histological study of the removed axillary lymph nodes and also in the marrow of the iliac bone. The patient's stature and weight were 131 cm. and 28 kg. respectively. A splenectomy was done. The removed spleen weighed 1,700 gm. In both cases the histological study of the removed spleen showed Gaucher's cells, which were also observed in the axillary lymph nodes and in the marrow of one of the patients. In both cases convalescence was uneventful. The patients were discharged from the hospital, as clinically cured, three and two weeks after the operation. Both patients are normal at the present time, 19 years and 1½ years after the operation respectively. The stature of the boy at the present time is 144 cm., his weight 35 kg.

The Kveim Test in Sarcoidosis. D. G. James and A. D. Thomson. Quart. J. Med. **24**:49-59 (Jan.) 1955 [Oxford, England].

Kveim obtained by intracutaneous inoculation of a heat-killed suspension of a sarcoid lymph-node, lesions histologically consistent with sarcoidosis in one to four weeks. Simultaneous control injections of Frei antigen and tuberculin did not produce this response. Since this reaction did not occur in normal subjects, nor in patients with lupus vulgaris, he concluded that the papules were specific lesions due to an unknown agent and that the test served to differentiate sarcoidosis from tuberculosis. James and Thomson describe the nature and preparation of the antigen, the method of the Kveim test, and their experiences with this test in 16 patients with sarcoidosis, 28 with tuberculosis, and 19 with a variety of other diseases. They found that after the intradermal injection of a saline emulsion of sarcoid tissue a dusky-red nodule develops insidiously at the injection site during the ensuing weeks, if the patient has active sarcoidosis. Histological examination of the nodule reveals characteristic sarcoid tissue. The test was positive clinically and histologically in 12 of 16 cases of sarcoidosis. It was negative in 28 patients with tuberculosis and in 19 patients with other diseases. In the absence of easily accessible lesions for biopsy, the Kveim test is a simple, safe, and specific outpatient technique for providing (1) histological proof of sarcoidosis; (2) an index of activity; (3) an index of the progress of the disease; (4) by serial biopsy, a method of evaluating various treatments.

SURGERY

The Management of Arterial Injuries in Battle Casualties. F. C. Spencer and R. V. Grewe. Ann Surg. **141**:304-313 (March) 1955 [Philadelphia].

Of 97 arterial injuries sustained by 85 patients in the Korean War, 89 were treated by arterial repairs and 8 by arterial ligations. Arterial repair was considered for all injuries of major arteries, including the subclavian, axillary, and brachial arteries in the upper extremity, and the iliac, femoral, popliteal, and posterior tibial above the origin of the peroneal artery in the lower extremity. Of the 89 repairs, 44 were done with arterial homografts, 3 with venous autografts, 24 with end-to-end anastomoses, and 18 with lateral sutures. Eighty-seven of the 89 repairs were satisfactory. There were six deaths in the postoperative group, two of which may have been related to the arterial surgery. Rupture or thrombosis was observed in 7 (16%) of the 44 arterial homografts in the first two postoperative weeks. Most of these complications resulted from preventable causes. Immediate regrafting was successfully done in two cases. Twenty-one amputations were performed for gangrene, an amputation rate of 22%. The incidence of amputation varied with the artery injured, the amount of soft tissue injury, and the time interval between injury and repair. Only one amputation was caused by the inability to accomplish an arterial repair. The amputation

rate for brachial artery injuries was 5%; for femoral artery injuries, 21%; and for popliteal artery injuries, 38%. Extremities requiring a vascular graft for repair had an amputation rate of 33% and those repaired by anastomosis, 17%. No amputations resulted from injuries that could be repaired by lateral suture. A definite time interval was not found beyond which arterial repair was futile. Most of the arterial repairs were completed within 14 hours after injury. Three extremities survived in a group of 10 that were repaired more than 15 hours after injury. Back-bleeding was not an infallible criterion as to whether an extremity would survive following arterial ligation. "Good" or "fair" back-bleeding was present in 9 of 20 extremities that subsequently became gangrenous. Massive venous occlusion appeared to be the cause of gangrene in three cases. Repair of concomitant venous injuries seemed indicated in extensive popliteal wounds. The extremities with the worst prognosis were those with injuries of the popliteal artery with severe injury of the soft tissue, usually in association with compound fracture. The poor prognosis arose from extensive destruction of collateral circulation, which shortened the period of time after injury in which an arterial repair would be successful. No indication was found for primary amputation in such cases.

The Hemostatic Response to Injury: A Study of the Korean Battle Casualty. R. Scott Jr. and W. H. Crosby. Ann Surg. **141:**347-356 (March) 1955 [Philadelphia].

Eleven young and previously healthy soldiers who had been moderately or severely injured in the Korean battle were given first aid treatment at the battalion aid station and were then evacuated to the forward surgical hospital for definite therapy. Their hemostatic response to the injuries they had sustained was studied from the first postoperative day until evacuation 4 to 10 days later. These casualties had received 6 to 16 pt. (2,839 to 7,570 cc.) of type O stored whole blood. Determinations of clotting time, plasma fibrinogen level, one-stage prothrombin time, and platelet counts were made daily. Sixteen additional patients had prothrombin time determinations only; these patients had received 5 to 30 units of blood. Results showed that stress in the form of battle injury, resuscitation, and operation produces a response that is similar to the response of the body following other forms of stress. This response is characterized by a rise in platelets, a rise in plasma fibrinogen level, a shortening of the clotting time with subsequent rise, and a decrease in prothrombin activity. None of these alterations was responsible for a hemorrhagic or thrombotic tendency of major clinical significance. Postoperative oozing of blood was not a major clinical problem and did not result from a known systemic deficiency. In the most severely injured casualty there appeared to be an adequate response of the coagulation mechanism to meet the threat of prolonged continued oozing from the innumerable open surfaces.

Intra-Arterial Transfusion in Treatment of Severe Injury. R. Cowie. J. Bone & Joint Surg. **37B:**112-116 (Feb.) 1955 [London, England].

Cowie uses a method of intra-arterial blood transfusion in which transfusion is made with the aid of an apparatus by forcing blood from a standard blood bank bottle into an artery by pressure supplied by a cylinder of oxygen. The oxygen is led through a reducing valve, which reduces the pressure to half an atmosphere, and then through a needle valve to regulate the flow. The oxygen then passes through a tube to which is connected a mercury manometer and a hand pump fitted with a release valve, and then on to the double two-way tap of the apparatus. From the proximal part of the double two-way tap it passes to one of the bottles. The blood is forced out of the bottle through the distal part of the two-way tap and along a length of semitransparent plastic tubing to the patient. When the bottle is almost empty the tap is turned through 90 degrees, and the flow continues without interruption from the second bottle. The first bottle can then be replaced by a full bottle while the second bottle is in use. The hand pump is used if the oxygen supply fails, and the release valve lowers the pressure should it become excessive. The chosen artery is exposed and the needle inserted pointed proximally. Two arteries have been used, the radial artery at the wrist and the femoral artery in Scarpa's triangle. Both sites have their advantages and disadvantages. The radial artery can be exposed quickly and if necessary ligated without great risk of ischemia, and a needle can be controlled more easily in this vessel than in the deep-seated femoral artery. Any large artery may be used if it is exposed by the injury or at operation. The author presents the histories of three patients in severe shock in whom this method of intra-arterial transfusions was used. It has also been used in seven patients during operations in which severe blood loss seemed possible. The author lists the following advantages of intra-arterial transfusion. 1. A rapid transfusion can be given to shocked patients with collapsed peripheral vessels. 2. There is less danger of overloading the pulmonary circulation, especially in the elderly patient. 3. Rapid increase in blood pressure and improved tissue perfusion can be obtained. 4. It combats the harmful and sometimes lethal effects of tissue anoxia caused by prolonged hypotension. 5. A small quantity of blood given intra-arterially gives better results than the same volume given intravenously. The disadvantages of this method are that it requires more apparatus and more supervision, that it is sometimes necessary to expose and ligate an artery, and that severe ischemic changes may occur in the limb distal to the site of the transfusion.

The Incidence of Postoperative Pancreatitis: Study of 131 Surgical Patients, Utilizing Serum Amylase Concentration. J. H. Mahaffey and J. M. Howard. A. M. A. Arch. Surg. **70:**348-352 (March) 1955 [Chicago].

An elevation in the concentration of serum amylase following abdominal trauma or in the presence of acute abdominal symptoms is considered a reliable indication of pancreatic injury or disease. Recent studies of the plasma amylase concentration following battle injury suggested that pancreatitis may result not only from direct injury to the pancreas but also from indirect trauma, such as injury at the time of surgery or subsequent bacterial injury. Mahaffey and Howard studied the serum amylase concentration of 131 patients who received surgical treatment in order to obtain more information about the incidence and significance of acute pancreatitis in the immediate postoperative period. Intra-abdominal operations were carried out on 100 patients, and 31 underwent operations other than laparotomy. Amylase determinations were done by the method of Wohlgemuth, according to which the normal range is between 15 and 40 units. The authors, however, noted normal values up to 50 units in studies on 70 controls. The studies on the patients undergoing operation demonstrated a striking incidence of pancreatitis following abdominal surgery and, particularly, after upper abdominal operations. Twenty-seven of the patients operated on exhibited values of 50 units or more, and nine of these had a concentration of more than 80 units. To date, the role of peritonitis in producing a secondary pancreatitis is not evident. The incidence of pancreatitis in this series following surgery of the duodenum strongly suggests that the complication rests on a mechanical basis. The severer forms of postoperative pancreatitis can easily be correlated with the patient's postoperative course, but as yet the milder forms cannot. In order to further clarify the syndrome, duodenal surgery, including major common-duct operations, must be followed routinely by serial serum-amylase determinations. Patients with operations distant to the pancreas developed a low amylase concentration, a finding suggestive of the stress response.

The Fate of the Cholecystostomy Patient. D. M. Hays and F. Glenn. J. Am. Geriatrics Soc. **3:**21-30 (Jan.) 1955 [Baltimore].

Of 3,643 patients undergoing 4,059 operations on the biliary tract at the New York Hospital-Cornell Medical Center between 1932 and 1951, 153 were subjected to cholecystostomy. One hundred three of these 153 patients were operated on during a phase of acute cholecystitis. The rationale behind the choice of cholecystostomy consisted of fear of choledochal injury in the presence of an obliteration of normal landmarks by acute inflammation in 49 patients, most of whom were aged; a severe chronic disease process (such as major cardiac disease, chronic pulmonary disease, carcinoma, and cirrhosis) associated with apparent acute cholecystitis in 45 patients; an acute disease

process elsewhere in the body associated with apparent acute cholecystitis in 9 patients; decompression of biliary tract in 6 debilitated patients with common duct obstruction; decompression of the biliary tract following operative trauma in the region of the choledochus in 11 patients; decompression of the biliary tract in primary pancreatitis in 11 patients; and decompression of the biliary tract in such conditions as inoperable malignant disease or congenital atresia in 22 patients. Of the 103 patients with primary disease of the biliary tract, 11 died postoperatively, 14 returned for elective cholecystectomy, and 78 did not return for elective cholecystectomy. Twenty-six of the 78 patients were completely asymptomatic with reference to the biliary tract, and 3 were lost to follow-up; 18 (approximately 25%) required emergency surgical intervention for recurrent disease of the biliary tract, and 31 (40%) had chronic debilitating symptoms of biliary tract origin. Cholecystostomy is a dependable, safe operative procedure for use in patients in whom cholecystectomy is contraindicated. If life expectancy is less than two years, for example, in patients with uncontrolled carcinoma or leukemia, it may be assumed that death will occur from the primary disease before further biliary tract difficulties develop. If, however, the patient's life expectancy is more than two years, it may be anticipated from the authors' data that the chances of subsequent symptomatic disease of the biliary tract are greater than 50%. Such patients are very apt to require emergency surgical intervention on the biliary tract under less than optimum circumstances. Cholecystostomy can only rarely be regarded as definitive therapy, and elective cholecystectomy is still indicated following cholecystostomy.

Drug-Induced Enteritis. H. F. Frame and D. W. Short. Lancet 1:434-435 (Feb. 26) 1955 [London, England].

A particularly virulent form of micrococcic (staphylococcic) enterocolitis seems to develop as a complication of "broad spectrum" antibiotic therapy. Frame and Short present the history of a man, aged 33, who was hospitalized with a ruptured gangrenous appendix, which was removed. After the operation he was given penicillin and streptomycin by intramuscular injection. Ileus developed postoperatively, but on the ninth day after operation bowel function was restored sufficiently to allow gradual discontinuation of the gastric suction and parenterally given fluids. Progress was not maintained, however, and on the 12th day a diagnosis of obstruction of the small intestine was made. At laparotomy the abdomen was found full of grossly distended coils of small intestine. This distension was mainly due to foul, yellow fluid and only to a very minor extent to gas. Retroperitoneal hemorrhages of purpuric type involved the posterior abdominal wall and the lower part of the mesentery of the small intestine. The obstruction appeared to be largely mechanical, for one of the distal coils of intestine was adherent at several points to an abscess in the anterior part of the abdominal cavity just above the pelvis. For 11 days the patient had received 600,000 units of penicillin and 1 gm. of streptomycin per day. In view of the severity of his illness, the presence of intraperitoneal pus, and the necessarily extensive intra-abdominal manipulations, it was considered advisable, pending a bacteriological report on the pus, to substitute for these two drugs a broad-spectrum antibiotic. Dissolved in a liter of Hartmann's solution, oxytetracycline hydrochloride, 0.5 gm., was infused twice daily, and ascorbic acid, 200 mg. twice daily, was also given intravenously. Immediately after the operation the patient's condition appeared satisfactory; but during the night he became restless and confused. A tentative diagnosis of oxytetracycline-resistant micrococcic enterocolitis was supported when examination of a rectal smear showed complete predominance of clumps of gram-positive cocci four days after the second operation. The oxytetracycline was immediately replaced by orally given erythromycin (400 mg. every six hours), and yogurt was given. The patient was given a pint of blood, followed by other intravenous fluids, but he died on the following day. Less than 4 gm. of oxytetracycline had been given when resistance was discovered. A micrococcus resistant to penicillin, chlortetracycline, and oxytetracycline was isolated from the throat, intestine, and blood and from the viscera after death. This complication could perhaps be prevented by preoperative treatment of nasal carriers by topical application of an antibiotic.

NEUROLOGY & PSYCHIATRY

Chronic Subdural Hematomas. J. L. Poppen. Geriatrics 10:49-51 (Feb.) 1955 [Minneapolis].

The present is a report of 119 patients with chronic subdural hematoma treated neurosurgically at the Lahey Clinic. Eighty-two of these patients were over 40. Seventy-four had a history of previous head injury, 15 were unconscious immediately following the initial injury, and 45 either did not remember having sustained an injury or regarded the injury as trivial. On admission to hospital, 40 patients were believed to have brain tumors, and in 5 of these the tentative diagnosis was cerebellar tumor. Sixty patients had disturbances of consciousness; 22 of the 60 were in deep coma and did not respond to painful stimuli. Three of these 22 patients died. Thirty patients who were in a confused state were able to follow simple commands but were not oriented as to time or place and did not respond clearly or accurately. Convulsions occurred preoperatively in 19 patients, of whom 7 had unilateral seizures. In only 15 of the patients was bilateral papilledema noted. Unilateral weakness was noted in 40 patients and unilateral paresis in 5. Spinal fluid examination was performed in 45 patients, and in 27 the pressure was above normal. The fluid was xanthochromic in 22. In patients in whom the ventricular fluid was examined, the total protein was uniformly elevated. X-ray films showed fracture of the skull in only eight patients: in two on the same side as the subdural hematoma and in six on the opposite side. The pineal body was displaced in 40 patients. Nineteen patients in this series had hygromatous subdural cysts containing yellow fluid with a high total protein value. The mortality of the series numbered eight patients. All the patients were treated by bilateral burr openings through which the hematomas were evacuated, with the exception of 24 patients in whom the hematoma was treated through a subtemporal decompression site. In 19 patients it was necessary to turn down osteoplastic bone flaps to remove organized subdural hematomas and also to treat the underlying cause. The author advises the washing out of all blood clots by inserting a rubber catheter into the cyst cavity and allowing the catheter to remain in situ for from 24 to 48 hours for drainage. In three patients the causal factor was rupture of an intracranial aneurysm. One patient had an underlying hemangioma; two had associated epidural clots. The latter, however, were as a result of injury at the time of the original accident. It should be remembered that these patients often do not remember a head injury and that subdural hematomas are likely to occur as the result of a head injury sustained during a convulsion. Arteriography is of particular value in demonstrating a subdural hematoma, the anteroposterior view being the most informative. Air studies will in most cases reveal the condition.

Electroencephalograms During Cycles of Addiction to Barbiturates in Man. A. Wikler, H. F. Fraser, H. Isbell and F. T. Pescor. Electroencephalog. & Clin. Neurophysiol. 7:1-13 (Feb.) 1955 [Montreal, Canada].

Previous experimental investigations had demonstrated that in subjects without previous histories of epilepsy or psychosis, convulsions and/or delirium occur regularly within five days after abrupt withdrawal of barbiturates after prolonged periods of chronic intoxication with these drugs. The present report is concerned mainly with the electroencephalographic concomitants of the behavioral changes that characterize the barbiturate abstinence syndrome. The 35 subjects studied were hospitalized with addiction to both opiates and barbiturates; they had no serious mental or physical disease. All volunteered for the experiments. All had been addicted to opiates one or more times in the past. Most had used barbiturates as well, generally when their supply of opiates had been curtailed. After preliminary stabilization on amounts of opiates and barbiturates just sufficient to prevent abstinence phenomena, opiates were withdrawn by the methadone substitution method. The subjects were then divided into two groups: group 1 included 14 persons who were given from 1 to 2.6 gm. of secobarbital daily in divided doses to maintain a more or less continuous state of intoxication for from 19 to 40 days, after completion of withdrawal of metha-

done, or 33 to 89 days from the date of admission. Group 2 included 21 persons who received 0.6 to 0.8 gm. of secobarbital daily in divided doses for from 10 to 44 days, after completion of withdrawal of methadone, or 38 to 58 days from the date of admission. After such periods of intoxication, administration of barbiturates was terminated abruptly, and observations were continued until complete recovery from the abstinence phenomena, which required periods of from two to four weeks. During the chronic intoxication the subjects in group 1 displayed varying degrees of ataxia, dysarthria, and other signs of cerebellar dysfunction, as well as changes in affect, sensorium, and judgment. Electroencephalograms were characterized by mixed rhythmic fast and slow abnormalities. Tolerance developed to the clinical effects of barbiturates but not to the electroencephalographic effects. After abrupt withdrawal of the barbiturates, varying degrees of anxiety, tremulousness, postural faintness, anorexia, insomnia, and weight loss developed in almost all the subjects. In addition, 11 exhibited one to four generalized convulsions on the second and third days of abstinence, and 9 had psychoses, generally in the form of agitated delirium between the fourth and seventh day of abstinence. Concomitantly, changes appeared in the majority of electroencephalograms, generally in the direction of periodic hypersynchronization, and with the frequent appearance of mixed spike and slow wave or 4 cps "spike-and-dome" paroxysmal discharges. After the eighth day, clinical recovery proceeded uneventfully, and electroencephalograms assumed a normal pattern in the majority of cases. During the period of chronic intoxication the subjects in group 2 displayed only mild or no evidence of ataxia. Concomitantly, electroencephalograms showed predominance of rhythmic fast activity in the frontal and parietal tracings. After abrupt withdrawal of barbiturates, abstinence phenomena were similar to but much milder than those observed in group 1. Only two subjects exhibited seizures, and psychosis developed in none of them. The electroencephalographic signs likewise were similar but milder than in group 1, with two striking exceptions, in which paroxysmal discharges were more common than in any patient in group 1. No direct correlations could be demonstrated between any given clinical state and any given electrocardiographic pattern. However, seizures were most commonly associated with random slow, random spike, diffusely slow, or paroxysmal activity in electroencephalograms, and slow abnormalities of various sorts predominated during periods of psychosis. These data confirm that seizures and/or delirium are likely to develop in persons without a previous history of epilepsy or psychosis when barbiturates are withdrawn abruptly.

Muscle Recovery in Poliomyelitis. W. J. W. Sharrard. J. Bone & Joint Surg. **37B:**63-79 (Feb.) 1955 [London, England].

Sharrard studied muscle recovery in 149 patients in whom paralytic acute anterior poliomyelitis had begun less than 32 days before admittance to the Royal National Orthopaedic Hospital. Each patient was examined on 10 occasions, at 1, 2, 4, 6, 8, 10, 12, 18, 24, and 36 months after the onset of the paralysis. A complete muscle test was made on each occasion, with the patient in a warm room, after rest. The grade recorded depended upon the power of a muscle in the third of three contractions through the greatest range of movement of the joint concerned. At the end of three years a complete follow-up had been obtained in 142 patients who received the standard treatment, which consisted in daily passive movements to the joints and active exercises to the muscles of an affected limb up to the point of fatigue. After three to four months, increasing functional activity was added, with diminishing attention to individual muscles. The duration of inpatient treatment varied between one month in mild paralysis and two years or more in severely paralyzed patients. The investigation of muscle recovery by manual methods has been criticized, but the author, who made all the tests on the patients under consideration here, feels that an incorrect assessment is almost always due to ignorance of the method, inattention to detail, lack of appreciation of the action of the muscle under test, or the deception of the trick action of another muscle. Objectivity is necessary in manual muscle testing. Tests should be made by someone who does not see and treat the patient every day. Before presenting the results of a three year study of recovery in 3,033 lower limb muscles and in 1,905 upper limb muscles in 142 patients, the author discusses the zero to 6 scale, in the terms of which the analysis was made. The rate of recovery of partly paralyzed muscles is the same in all muscles and muscle groups in the lower or upper limb. Clinical differences in the ability of individual muscles to recover depend upon the proportions of their number that remain permanently paralyzed. The key to the understanding of muscle recovery in poliomyelitis is the division of the paralysis into a "recoverable" and an "irrecoverable" fraction whose proportions are determined by the site and extent of the motor nerve cell destruction that has occurred during the acute stage of the disease. When the irrecoverable fraction—that is, the muscles that are permanently paralyzed by loss of all the motor nerve cells supplying them—is separated from the remainder, the true picture of muscle recovery can be seen. Whatever the mechanisms of muscle recovery are, whether neural, muscular, or a combination of the two, they must act in the same way in all muscles and in all patients. In this respect the recovery of muscle in poliomyelitis differs from the recovery in peripheral nerve injuries, in which factors such as the quality of the suture line and the distance of the muscle from it determine the outcome. The similarity of the curves of recovery for different muscles and the absence of any sudden spurts of recovery in poliomyelitis suggest that downgrowth of axons from the spinal cord plays no part in recovery. The rate of recovery is slowest in adults and most rapid in young children. The amount of further recovery to be expected in a muscle can be predicted from a knowledge of its grade at any time after one month from the onset of the paralysis. Fourteen-fifteenths of the total amount of recovery takes place by the beginning of the 12th month; with rare exceptions individual muscle recovery is complete after 24 months. Ninety per cent of muscles that are still completely paralyzed after six months remain permanently paralyzed. The prognosis of a completely paralyzed muscle is related to the level of paralysis in muscles supplied by the same spinal segments. Deterioration in power in a muscle is uncommon and, when it occurs, is associated with the presence of the strong opposing force of antagonist muscles or of gravity.

Iceland Disease in Indiana: Case Report. E. F. Hardtke. J. Indiana M. A. **48:**245-250 (March) 1955 [Indianapolis].

A 41-year-old woman had an illness characterized by marked muscle aching and spasm especially in the posterior cervical area and shoulder girdle, associated with sensory symptoms and signs, emotional changes, and a prolonged convalescence with tendency to relapse. This disease, which resembled acute anterior poliomyelitis, is considered to have been identical with that reported as Akureyri disease in 1950 and Iceland disease in 1954. Previous reports indicate that the infectious agent of this disease is transmitted by personal contact, with an incubation period of 4 to 10 days; there was no suggestive history of this sort in the present case. Both the 1950 and the 1954 epidemics had a higher incidence among women than among men. In the patient whose case is described the symptoms first noted were headache and stiff neck, but there was also apparent on the day of onset impairment of position sense evidenced by difficulty in dancing. This is in keeping with previously reported early involvement of the posterior columns of the spinal cord. Also in keeping with other reports was the patient's low grade fever, which continued over a period of months. In contrast to other reports this patient had hypersomnolence rather than sleeplessness. Despite subjective complaints of muscle weakness, this could not be demonstrated on examination except on repeated examination of a particular muscle or muscle group. It would appear that muscle weakness is secondary to easy fatigability of the muscle; it has been postulated by White and Burtch that there may be direct muscular involvement as well as neurological involvement. At no time was there actual paralysis in this woman, nor were deep tendon reflexes reduced. The emotional changes reported in her case, which persisted throughout convalescence, were especially evident by contrast with her former confident, energetic personality; the changes noted, however, were not out of keeping with those reported in previous cases. Iceland disease can be diagnosed on the basis of the symptoms mentioned together with absence of laboratory evidence supporting a conflicting diagnosis. Treatment can only be symptomatic and consists mainly of bed rest

throughout the acute attacks and at frequent intervals during the ensuing period. Orthopedic supports for paretic muscles may be indicated. Very few of the patients whose cases are reported in the literature were free of symptoms on reexamination as late as 9 to 15 months after onset. The most persistent symptoms are those of muscular ache and tenderness and easy fatigability. Personality disturbances are slow to clear up, and the patient complains of being more easily depressed, upset, and "nervous." Memory difficulties and arthritic symptoms are fairly common months after the acute attack.

PEDIATRICS

Results of Hormonal Treatment of Bouillaud's Disease. P. Mozziconacci and M. K. Caramanian. Arch. mal. cœur **48**:3-59 (Jan.) 1955 (In French) [Paris, France].

This detailed evaluation of hormone therapy in rheumatic fever is based on 267 patients followed up for as long as 3½ years and at least one year. The authors have not made a comparative study of hormone and salicylate therapy in this disease, but it is their impression that the former is preferable. Twenty-three children had severe rheumatic carditis, with accompanying signs of progressive endomyopericarditis, peripheral or visceral signs of cardiac insufficiency, and severe changes in the general condition. Of these patients, 6 died, and, of the 17 survivors, 12 had no further rheumatic attacks. One hundred thirty-one patients had uncomplicated rheumatic carditis without much alteration in the general condition but with progressive cardiopathy; in this group six died and the rest were benefited by treatment. One hundred fourteen had no further rheumatic attacks. Of the 113 patients with acute articular rheumatism without cardiac impairment, 111 left hospital with normal hearts and 2 with murmurs that had appeared during treatment; 100 patients had no recurrences. Regarding choice of hormone, the authors regularly use cortisone in order not to run the risk of a poor adrenal response, to make the patient more comfortable, and to avoid the appearance of antihormones. They use corticotropin only in emergencies in which intravenous administration is needed. The following doses of cortisone were used: 100 mg. a day for children under 5, 150 mg. for those between 5 and 10, 200 mg. for those between 10 and 15. For the first 48 hours these doses are increased by 50 mg. a day. The average dose of corticotropin per day was 10 mg. in slow infusion. Treatment must be individualized, however. The authors conclude that hormone therapy should be used as early as possible in the course of any rheumatic attack, even one that has a benign appearance.

Pertussis: Prevention, Physiology, and Treatment. K. Blanchard and R. A. Ford. Rocky Mountain M. J. **52**:278-284 (March) 1955 [Denver].

It has been shown that the use of pertussis vaccine at the age of 4 months, when administered in three doses of 1.0 to 1.5 cc. each, and at intervals of two weeks, affords protection in approximately 75% of infants and that the immunity thus conferred lasts about four years. This immunity may be further extended at the end of this period by a single 1.0 cc. injection of the vaccine. This prophylactic measure has very substantially reduced the cases of whooping cough, but apparently little has been done for those cases that remain refractory to the immunizing vaccine. Furthermore, thousands of children are never given the benefits of active immunization. Blanchard and Ford stress that the respiratory tract fluid plays an important part in the physiology of coughing and in the use of expectorants and cough remedies. After other observers had found that a preparation containing glyceryl guaiacolate with desoxyephedrine gave excellent therapeutic results, the authors used the same preparation during the past 18 months in 115 patients with pertussis who were treated at the Essex County Isolation Hospital, Belleville, N. J. About 70% of the children were under 4 years of age, and, of this group, 39 were infants under one year of age and 43 were from 1 to 4 years of age. Of the remainder, 24 were in the age group from 4 to 10 years, and 9 of the children ranged in age from 10 to 12. With the exception of eight, all patients exhibited severe spasmodic whooping cough. This severity was the principal reason for hospitalization. The patients were under constant observation of experienced nurses, and, in addition, the physician in permanent residence was present several hours daily. In the opinion of both physicians and nurses, the results from the use of glyceryl guaiacolate–desoxyephedrine preparation were most satisfactory. The severity and frequency of the paroxysms of coughing were markedly reduced. Nocturnal paroxysms of coughing were greatly diminished, and the vomiting of food occurred much less frequently than might have been expected. The children became more interested in food and began to put on weight instead of losing it; they were less fretful and slept better. They were in far better physical condition when discharged from the hospital than had been the experience previously.

Chronic Ulcerative Colitis in Children. J. A. Bargen and R. L. J. Kennedy. Postgrad. Med. **17**:127-131 (Feb.) 1955 [Minneapolis].

A report from the Mayo Clinic in 1940 reviewed the histories of 95 children with chronic ulcerative colitis. This represented approximately 11% of the patients with chronic ulcerative colitis, that is, one of every nine patients with chronic ulcerative colitis was under 15 years of age. In this report Bargen and Kennedy review observations on 139 children with chronic ulcerative colitis observed at the Mayo Clinic between 1944 and 1953. The onset as well as the relapses occurred during the months when respiratory infections are especially frequent. Although the disease is basically the same in childhood as it is in later life, it is likely to be more severe, and the response to treatment is less satisfactory than in adults. When the disease began in early childhood and persisted during the formative years, growth and development were diminished. The disease seemed to be commoner in boys than in girls by a ratio of 86 to 53. The commonest age of onset was 8.6 years, although in six children the disease began between the ages of 1 and 2 years. The proctoscopic appearance of the lesions varied from so-called mild (grade 1) to very active disease (grade 3), but grade 2 involvement was most frequent. The rectum alone was involved in 11 children; in 4, the rectum and sigmoid; in 6, the lesions extended from the anus to the splenic flexure; in 6 others, to the hepatic flexure; in 96, the entire colon was involved, and in 13 of these the terminal ileum was also involved. The disease was very severe and destructive in 21 of the 96 patients. Twelve children had rectal polyps, and in two of them carcinoma developed, in one at the age of 17 and in the other at the age of 18 years. Two children had liver disease; four had arthritis. In three, perirectal fistulas developed. In six there was failure of growth and of development of secondary sex characteristics so that they gave the appearance of pseudodwarfism. In 26 there was chronic invalidism, and in 24 others complications developed, including rectal stricture, pyoderma gangraenosum of the skin, and other less common conditions. A considerable number of these patients were subjected to psychiatric investigation, but practically no causative or therapeutic information was obtained. In the early part of this study, Neoprontosil was the drug commonly prescribed. Later, phthalylsulfathiazole (Sulfathalidine) was employed, and in the latter part of the study, salicylazosulfapyridine (azopyrin, azulfidine) was used extensively. The results from treatment with the latter drug far exceeded those of any previous drug used. Blood transfusions were given to 67 patients, and 6 were operated on. Eight children died, including two of the six who had been operated on. It is usually advisable to keep these patients under observation in the hospital for several weeks, and during this time a discussion of a plan for their future living is carried out. A dietary program is established and the dosage of medicines is ascertained. These children do best on a diet high in protein, high in vitamins, high in calories, and low in residue. For control of the intestinal infection, three important measures have emerged. These are blood transfusions, the proper use of antibiotics, and the administration of salicylazosulfapyridine (azopyrin, azulfidine). During the acute or fulminating phase of this disease, the establishment of proper fluid balance is of the greatest importance. The study of levels of potassium and other electrolytes is of great value. Surgical treatment should be avoided if possible.

Coeliac Disease: Is There a Natural Recovery? J. W. Gerrard, C. A. C. Ross, R. Astley and others. Quart. J. Med. **24:**23-32 (Jan.) 1955 [London, England].

Dicke's observation in 1950 that children with celiac disease improved when wheat and rye flour were excluded from their diets was confirmed by other observers. It was also shown that there was an associated decrease in fecal fat and that the harmful substance in wheat flour is in the gluten fraction; when this fraction is excluded from the diet rapid improvement ensues. Although children frequently showed clinical improvement on earlier dietary regimens containing varying amounts of wheat gluten, this improvement was slow, and relapses were frequent. The authors reexamined children in whom a diagnosis of celiac disease had been made before 1949 and who had not received treatment with a gluten-free diet. The series studied comprised 32 children and adolescents ranging in age from 4 to 19 years. In 22 of the children the first symptoms had developed between the ages of 8 months and 24 months, that is, soon after the introduction of mixed feeding. The classical celiac triad of diarrhea, abdominal distension, and loss of weight was observed in all except one of this group. In the remaining 10 children the first symptoms did not develop until after the age of 24 months, and in 5 not until the age of 4 or 5 years. In this group the symptoms were failure to gain weight or loss of weight and in some cases pallor or abdominal pain, or both, with vomiting. All 32 children had some degree of iron-deficiency anemia. Steatorrhea was observed in 29 of the children. At the time of reassessment all were receiving normal diets or diets restricted only in their fat content. A thorough history was taken, which included details of the diet and any persisting symptoms. Not one of the patients appeared to have recovered completely; the commonest persisting symptom was a mild intermittent diarrhea. The majority were below average in weight and height for their respective ages. Biochemical, hematological, and radiological investigations confirmed the clinical impression that the celiac disorder had persisted. Steatorrhea, flat oral-glucose-tolerance curves, anemia, and dilated small intestinal patterns were found, singly or in combination, in all cases. It is concluded that children with celiac disease maintained on regimens that contain wheat gluten do not make a complete recovery. It is probable that optimal growth and health will be achieved only on a diet free from wheat gluten, which should be maintained at least until maturity.

Present Concepts of Lipid Nephrosis and Its Treatment. J. Chaptal, R. Jean, Mrs. C. Campo and D. Alram. Presse méd. **63:**264-267 (Feb. 23) 1955 (In French) [Paris, France].

Many of the uncertainties surrounding lipid nephrosis, which is a disease of the renal glomerulus leading to secondary tubular lesions and eventual renal sclerosis, can be clarified in the light of recent studies. The primary lesion of lipid nephrosis, which affects the basal membrane of the glomerular capillaries and also that of the capsular epithelium and the connective tissue lying between them, has been called a membranous glomerulitis. It is apparently related to a depolymerization of the mucoproteins and a fibrinoid necrosis that destroys the complex arrangement of the glomerular filter and produces enlargement of the filter pores. The resulting inflammatory connective tissue reaction represents a repair process of the proliferative type. Membranous glomerulitis, which is specific for lipid nephrosis, is generally associated, at least in the beginning, with lesions characteristic of glomerulonephritis, although it may appear alone. The nephrotic lesions, unlike those caused by the glomerulonephritis, which usually heal, persist, and eventually the destruction of the glomerular filter permits albumin and lipids from the blood to pass into the glomerular filtrate. The renal tubular cells finally become so loaded with lipids that they resemble hepatic cells during the development of hepatic steatosis. Fibrotic changes appear as a result of these processes and renal sclerosis develops. The cause of lipid nephrosis is unknown, but certain facts suggest that it is due in some degree to an immunoallergic process set in motion by infection, especially rhinopharyngeal. Treatment should be designed to restore the glomerular filter and to prevent relapses. Restoration of the glomerular filter can be obtained by the use of corticotropin or cortisone, if therapy is started before the sclerosis becomes irreversible. Children under 5 years of age can be given 150 mg. of cortisone or hydrocortisone daily; those from 5 to 10 years old, 200 mg., and those over 10, 250 mg. The hormone therapy, which may be given in discontinuous courses, should not be stopped until the disappearance of albuminuria has been shown by repeated examination. This is the only practical test by which functional restoration of the glomerular filter can be demonstrated. Antibiotics should also be given to combat infection, and foci of infection in the tonsils, adenoids, or teeth should be removed. The frequency with which relapses, usually caused by infections, follow an initial attack of lipid nephrosis makes rigorous buccal and rhinopharyngeal hygiene and continuous antibiotic treatment (400,000 units of penicillin a day, taken orally) advisable. Urinalyses should be made at least twice a week and if albuminuria, unexplained by intercurrent infection, appears and persists for more than three days even in amounts of less than 0.50 gm. per 100 cc., the hormone treatment should be reinstituted. The results obtained by this method have been encouraging, but it is too soon to say whether they will be permanent.

UROLOGY

Primary Carcinoma of Ureter: A Pathologic and Prognostic Study. G. F. Whitlock, J. R. McDonald and E. N. Cook. J. Urol. **73:**245-253 (Feb.) 1955 [Baltimore].

Whitlock and associates review pathological studies on 33 patients (27 men and 6 women) with primary carcinoma of the ureter who were treated surgically at the Mayo Clinic prior to 1945. The clinical aspects of 27 of the 33 cases had been reported previously. This series is relatively large, when it is considered that only 312 cases have been reported in the literature. The material studied consisted of the preserved gross operative specimens, available in 25 of the 33 cases, which usually consisted of the kidney, the entire ureter, and frequently a small segment of bladder surrounding the intramural ureter. In the remaining 8 cases, the original microscopic sections were utilized in lieu of the gross specimens. After first determining and recording the number, size, location, and gross appearance of each ureteral tumor, blocks of tissue were cut in such a manner that the sections were representative of the entire tumor and full thickness of the ureteral wall. This allowed study of the underlying and adjacent ureter for submucous and muscular infiltration and for involvement of the ureteral veins and perineural lymphatics. A microscopic study was made on each tumor without recourse to the clinical history and the fate of the patient. After completion of the histopathological study the clinical histories were reviewed for pertinent clinical data and follow-up letters were sent to all surviving patients to determine their subsequent course. Seventeen of the tumors were purely papillary in structure, nine were papillary and infiltrating, five were nonpapillary, infiltrating, and two could not be classified. About half of the tumors (17) were of low histological grade (grades 1 and 2), and the other 16 were of high grade malignancy (grades 3 and 4). The majority of pure papillary carcinomas were of a low degree of malignancy, and the majority of papillary and infiltrating and pure infiltrating carcinomas were of a high degree of malignancy. Vein and lymphatic involvement occurred only with carcinomas showing infiltration. The frequency with which such involvement was found in this study is undoubtedly lower than the actual incidence. At least one-half of the papillary carcinomas of the ureter were associated with, or followed by, similar carcinomas in the bladder. The nonpapillary tumors did not exhibit this tendency. There were 10 instances among the 33 cases in which bladder tumors developed after removal of the primary carcinoma of the ureter. This fact makes it advisable to carry out regular, routine postoperative cystoscopic checkups just like in cases of carcinoma primarily in the bladder. The prognosis of low grade papillary tumors of the ureter is good. The prognosis of high grade tumors showing evidence of infiltration is extremely poor. Of the patients with a papillary

carcinoma, 66.7% lived five or more years. Only one patient with an infiltrating carcinoma lived as long as three years, and he was not cured. Of the patients with a grade 1 or 2 carcinoma, 77.7% lived five or more years. No patient with a grade 3 or 4 cancer lived as long as three years. The standard operation of complete nephroureterectomy, as practiced today, is adequate and satisfactory for the treatment of the papillary types of carcinoma of the ureter but not for infiltrating carcinoma of the ureter. Whether more complete dissection of the regional lymphatics would offer a higher rate of cure remains to be seen.

Clinical Application of Artificial Kidney. P. Confortini, F. Siracusano and T. Cesco. Minerva med. **45**:1640-1648 (Dec. 15) 1954 (In Italian) [Turin, Italy].

The authors used the artificial kidney on seven patients. They used the continuous and direct system in six patients and the fractional system in one. They did not attempt to cure the seven patients whose condition was already irreversible; their aim was to study the patients' reaction and tolerance to dialysis and the limits within which this can be carried out. One of the gravest dangers in using the artificial kidney, especially if uremia is present, is water imbalance, namely, the passage of water from the dialyzing fluid into the blood. This can occur because of minute defects in the cellophane, or because of a difference in osmotic pressure at the two sides of the membrane. To prevent the latter, the dialyzing fluid must have an osmotic force that is equivalent to, or greater than, that of the plasma of the patient. Before preparing the dialyzing solution it is therefore essential to determine the cryoscopic point of the patient's plasma and the potassium blood level. Intense heparinization is needed to maintain the fluidity of the blood. Heparin should be administered slowly, and, if signs of cerebral or pulmonary impairment appear, its administration should be interrupted at once and protamine sulfate, which neutralizes the dangers of heparin, should be administered. The onset of chill and high fever is generally caused by pyrogenic substances and can be prevented by cleansing thoroughly the apparatus through which the blood is to flow. The administration of antihistamines, vitamin H, and other such agents is useful once these symptoms have appeared. The artificial kidney need not be dangerous, and good results can be obtained if it is used early in patients in whom the renal lesion is reversible (acute anuria). For patients with chronic lesions in whom the anatomic and functional condition is irreversible it is only a palliative measure. The results depend mainly on the exact evaluation of the patient's condition.

Further Experience with Intracavitary Radiocobalt for Bladder Tumors. F. Hinman Jr., J. W. Schulte and B. V. A. Low-Beer. J. Urol. **73**:285-291 (Feb.) 1955 [Baltimore].

Hinman and associates started to use radioactive cobalt beads for intracavitary irradiation of bladder tumors five years ago. The radiocobalt bead is placed in the central channel of a balloon catheter so that, when the bag is inflated, the bead is held at the geometric center of the bladder. The catheter has special perforations so that it will hold the bead and still permit the outflow of urine. The rationale for using radiocobalt in preference to radium is that the radiocobalt bead, 0.5 cm. in diameter, presents practically a point source of radiation. From such a source, ionizing radiation can be delivered uniformly to the mucosal surface of the spherical bladder as well as, in adequate quantities, into its walls. This method has been used in 35 patients, some of whom received external x-ray treatment to the bladder and the perivesical tissues in addition to the intracavitary irradiation with radiocobalt, in order to deliver more adequate doses to the perivesical tissues farther away from the bladder wall. In the first group of patients treated, radioactive cobalt beads of approximately 20 mc. equivalent were used. In the subsequent group, radiocobalt beads of 80 and 90 mc. equivalent were employed. While the exposure time in the first group of patients was necessarily around 100 hours, the group treated with the high intensity beads had only 8 to 10 hours. The dose of radiocobalt varied between 2,500 r to 3,000 r (twice at 7 to 10 day intervals; total dose 5,000 r to 6,000 r), and the x-ray dose was around 3,500 r in 35 to 40 days. The authors gained the following impressions: Many lesions that are not deeply infiltrating can be destroyed with intracavitary radiocobalt irradiation. In multiple noninfiltrating tumors, intracavitary radiation therapy should not be delayed but employed as the first treatment. When, however, there are only one to three noninfiltrating lesions, not exceeding 2 to 3 mm. in diameter, then intracavitary radiation is not preferable to surgery. Most of the infiltrating lesions are only temporarily arrested even with combined intracavitary and external irradiation. Varying degrees of radiation cystitis and bladder contraction result from the radiocobalt treatment in many patients. Further experience with modifications of the radiation technique, particularly with greater fractionation and prolongation of treatment time, is needed to decrease the damage to the bladder in otherwise successfully treated patients. Use of radiocobalt beads of 30 to 40 mc. equivalent intensity and a decrease in each separate dose and prolongation of the duration of the whole treatment to three to four weeks is the technique now under consideration. In far-advanced lesions, radiation treatment can have a palliative effect only, but it may be effective for persistent bleeding.

OTOLARYNGOLOGY

Revision of the Miot Technique in Mobilization of the Ossicle System: Its Otoneurologic and Acoustic Basis. D. E. Schneider. A. M. A. Arch. Otolaryng. **61**:207-211 (Feb.) 1955 [Chicago].

Schneider shows that Rosen's description of mobilization of the stapes is practically the same as that suggested by Miot in 1890. Miot's results were even more dramatic than those achieved by Rosen, yet after one decade mobilization of the stapes was abandoned. At that time (1900) Siebenmann had pointed out that mobilization of the stapes was not only useless but often harmful and that the fixation of the stapes in cases of progressive spongiosity takes place by the ossification of the periosteum. This remark by Siebenmann induced Schneider many years ago to evolve the theory of a dual hearing system, which states that in higher mammals there are two hearing systems that became fused: 1. In man the most highly developed cochlea in relationship to the most highly developed labyrinth became differentiated for the perception of external sound and of human speech. 2. A primitive sonic system controlling the vibrating ossicles via the tympanic plexus and its associated ganglions could conceivably influence the labyrinth via the geniculate ganglion and the nervus intermedius. Disease of this more primitive system was held responsible for tinnitus and vertigo. It was Schneider's aim to free the ossicle system from disease of the old sonic system contained in the tympanic plexus and, especially, in the nerve of Jacobson. In this way external sound can again dominate internal sound. Similarly, this theory takes as its goal the prevention of ankylosis of the stapes in beginning deafness. The two new elements added in Schneider's experimental revision of the Miot technique have for their goal, first, the freeing of the stapes from possible trophic disturbances arising in the tympanic plexus and conveyed by the nerve of Jacobson and the petrosal branches, and, second, the restoration of the rotary acoustic aspects of stapedial action, which involves also the function of the stapedius muscle. The mobilization of the stapes is essentially free rotary movement in combination with oscillation perpendicular to the plane of the stapedial footplate. In view of the small percentage of satisfactory results achieved by Rosen's technique, Schneider suggests what he terms the Miot-Holmgren technique with interruption of the nerve of Jacobson and of the petrosal branches. Special surgical devices to achieve rotary freedom of the stapes are planned. Schneider regards it as necessary to differentiate before operation a mobilizable from an irreversibly fixed stapes. The latter group can only be treated by fenestration. In this way many deafened persons will avoid needless and futile surgery, including the danger of broken crura and torn chordae tympani. The author does not agree with Rosen's statement that the chorda tympani is an expendable nerve; salivation and taste are important functions. A surgery of deafness can now be evolved that need not injure any important structures.

PATHOLOGY

Premature Senility and Dwarfism—Progeria of Gilford. R. Clément. Presse méd. **63:**155-157 (Feb. 5) 1955 (In French) [Paris, France].

Children with progeria have signs of premature, accelerated senility, with slowing, followed by arrest, of development. The end-result is dystrophic dwarfism with infantilism. These patients look like wrinkled, bald old men. Their joints are knotty, their shoulders are stooped, and their knees are slightly bent. Their heads appear large, with prominent veins of the forehead, beak-like noses, receding chins, and protruding eyes. Early death occurs, caused by geriatric illnesses such as hardening and tortuosity of the arteries, hemiplegia, and angina pectoris. The cause of this disease is not known. Certain symptoms —disappearance of the panniculus adiposus, discolorations and lesions of the skin, and bone and joint changes—suggest that the adrenal cortex plays a part in progeria, but pathological evidence does not support this idea. The fact that progeria seems to be the exact counterpart of acromegaly points to a role played by the hypophysis or a neuroendocrine disturbance of some sort. To bear out this theory, the existence of progeroid or gerodystrophic syndromes with psychic, motor, or sensory cerebral disorders is pointed out. Progeria seems to bear resemblance both to premature senility in adults and to normal aging; thus, patients with this rare disease may help to further knowledge about the aging process.

Morphological Studies of Hyaline Membranes in the Newborn Infant. W. S. Gilmer and A. M. Hand. A. M. A. Arch. Path. **59:**207-213 (Feb.) 1955 [Chicago].

Hyaline membranes characteristically occur in premature infants, in those delivered by cesarean section, and in infants of diabetic mothers. This investigation concerns histological and histochemical studies on the respiratory segment of the lungs of 10 newborn infants with hyaline membranes; an 8-year-old girl with rheumatic fever; a 3-month-old boy with bronchopneumonia; a 2,180 gm. premature infant who died 20 minutes after breech delivery; a 1,010 gm. premature infant who died suddenly at the age of one day; and a 1,250 gm. stillborn male infant, with premature separation of the placenta. Gilmer and Hand feel that their findings may be of significance in the pathogenesis of this condition. They found that a basement membrane lines the respiratory segment of the human lung which may be distinguished from the capillary basement membrane. Between the two there is a connective tissue space. In newborn infants with hyaline membrane, the offending material may be found beneath this basement membrane. The authors feel that this indicates that the material is of endogenous origin, and they suggest the following possibilities. 1. The material is derived from the blood stream, presumably as a result of capillary damage. 2. It may be that the basement membrane itself, representing a continuation of the cytoplasm of the lining cells, may undergo alterations, so that the hyaline membranes actually represent a change within the basement membrane. 3. Changes may occur in the connective substances between the two basement membranes to produce the accumulation of hyaline material.

Clinicopathologic Significance of the Demonstration of Viable Tubercle Bacilli in Resected Lesions. O. Auerbach, G. L. Hobby, M. J. Small and others. J. Thoracic Surg. **29:**109-135 (Feb.) 1955 [St. Louis].

A clinicopathological correlation with microbiological observations was performed on resected tuberculous lesions from 19 patients. Four of these patients were considered as controls, two because they had received virtually no chemotherapy and two because they had open cavities at the time of resection. Fourteen of the remaining 15 had received from 4 to 12 months of chemotherapy preoperatively and showed morphological evidence of cavity closure. One had received 11 months of chemotherapy preoperatively and showed evidence of an open cavity with healing. The recovery of viable tubercle bacilli from the 4 control patients and also from 11 of the 15 original and retreatment patients has been reported. No correlation between the presence of viable tubercle bacilli in tuberculous lesions and duration of chemotherapy, drug regimens used, duration of the preoperative period, noninfectiousness, or the anatomic nature of the lesions could be demonstrated in this study. The authors believe that the necrotic foci in the lung that have never liquefied and have subsequently become encapsulated are not a potential danger because they do not communicate with bronchi and because they do not subsequently undergo liquefaction but become progressively firmer with the deposition of calcium salts. On the other hand, inspissated cavities with communicating bronchi, after prolonged chemotherapy on regimens in use at present, are potentially dangerous in a high percentage of cases.

Histoplasmosis: Proved Occurrence of Inapparent Infection in Dogs, Cats and Other Animals. C. W. Emmons, D. A. Rowley, B. J. Olson and others. Am. J. Hyg. **61:**40-44 (Jan.) 1955 [Baltimore].

While the occurrence of histoplasmosis in several species of animals has now been established, there is no apparent hazard of transmission of the disease directly from animal to man, except possibly in the rare case of severe infection. The public health importance of histoplasmosis in animals is related, rather, to the role infected animals may play as indexes of the geographic distribution of Histoplasma capsulatum. Since October, 1945, a search for the natural occurrence of H. capsulatum in soil and animal hosts has been conducted in a rural county in Virginia, where four fatal human cases of histoplasmosis have occurred. Histoplasmin sensitivity has been observed in 83% of general population groups in this area. In the survey, which extended over eight years, 4,664 animals were killed and examined by culture for evidence of histoplasmosis. H. capsulatum was isolated from tissues of 145 of 397 dogs, 81 of 449 cats, 75 of 2,149 rats, 3 of 95 opossums, 2 of 18 skunks, 1 of 988 house mice, 1 of 30 foxes, and 1 of 37 woodchucks. With few exceptions the animals did not have clinically apparent histoplasmosis. The dog and cat may serve as effective and easily examined indexes of the presence of H. capsulatum in a geographic area. H. capsulatum was isolated repeatedly from soil on five farm premises.

RADIOLOGY

Sudeck's Syndrome After Fractures. G. Bierling and D. Reisch. Fortschr. Geb. Röntgenstrahlen. **82:**1-14 (Jan.) 1955 (In German) [Stuttgart, Germany].

Bierling and Reisch discuss osteoporosis due to trauma (Sudeck's syndrome) on the basis of studies they made on 587 cases of this disorder, which were found in 3,170 simple fractures of the extremities. This is an incidence of 18.5%. Reports about the incidence differ, partly because it is often difficult to decide whether the incipient decalcification should be regarded as Sudeck's osteoporosis or as "physiological transformation." The authors are concerned with finding the earliest roentgenologic signs in order to facilitate earlier diagnosis and, through this, treatment at a more advantageous time. Traumatic osteoporosis occurred twice as often in the lower as in the upper extremity. Women of the menopausal age showed a special predisposition. One hundred eight of the 587 cases of osteoporosis resulting after fractures were severe, and these, like the milder forms, occurred more frequently in the lower than in the upper extremities, and women in the menopause were again most frequently afflicted. As regards the various roentgenologic manifestations, the authors differentiate between the spotty or maculated, the band-shaped subchondral, the metaphysial, and the diffuse forms. Mixed forms were also observed. The diffuse form of Sudeck's osteoporosis occurred chiefly in children up to 15 years of age; it usually subsided

rapidly. A subtle exposure technique is important for the demonstration of the diffuse form. Overexposure may simulate diffuse decalcification in a normal bone. A comparative exposure of the normal extremity may permit clarification in doubful cases. The band-shaped areas of lesser density in the region of the metaphysis, which are followed by subchondral and later by spotted decalcification, indicate Sudeck's osteoporosis, particularly in fractures of the radius and of the malleoli. In shaft fractures of the long tubular bones Sudeck's osteoporosis is frequently characterized by the "mouse-eaten" bone changes that ordinarily suggest bone tumors. Whereas some observers maintain that Sudeck's osteoporosis is rare after medullary nailing of fractures according to Küntscher, the present authors observed that mild and rapidly disappearing forms occurred rather frequently with Küntscher's method. Osteosynthesis with the aid of wires or screws also may be followed by osteoporosis, but in this treatment it is rarely severe. Fractures of the calcaneus, however, in which wire extension is often necessary for reduction, are frequently followed by severe forms of osteoporosis. The authors noted this complication in 24 of 37 calcaneal fractures. They gained the impression that the finely spotted osteoporosis subsided more rapidly than the form in which the decalcification was of a more coarse appearance. Roentgen irradiation of the truncus sympathicus (through paravertebral fields), of the popliteal space, of the fracture region, or of the neighboring joint proved helpful in the treatment, particularly when combined with injections of methylandrostenediol (Methandriol).

Percutaneous Splenoportography. M. M. Figley, W. J. Fry, J. E. Orebaugh and H. M. Pollard. Gastroenterology **28:**153-162 (Feb.) 1955 [Baltimore].

Radiological visualization of the splenic and portal veins has diagnostic value of two principal kinds. Certain hemodynamic changes of portal hypertension may be seen, allowing objective planning and evaluation of surgical treatment. Secondly, these veins may be used for diagnostic probing of the upper abdomen, giving evidence concerning mass lesions by their displacement and compression. The authors' experience with 25 attempts at splenoportography in 20 patients indicates that the proeedure is technically simple, generally successful, seldom seriously discomforting to the patient, and reasonably safe. The principal risk, splenic hemorrhage, will probably occur in about 1% of cases; percutaneous splenoportography should not be undertaken if splenectomy cannot be tolerated. A test injection of dilute contrast medium is useful to ascertain the needle position and is recommended in uncertain punctures to prevent painful extrasplenic depositions of contrast. For maximum information serial filming of some type should be used. In all, 19 splenoportograms were obtained in this series. They were particularly useful in localizing the site of portal obstruction, in determining the adequacy of the portal vein to portocaval shunt, and in demonstrating the patency of the shunt postoperatively. Benign and malignant lesions of the pancreas and liver may be recognized by this procedure although not clearly differentiated. It is to be hoped that further experience with the method will prove it to be of value in the diagnosis of neoplasms of that region.

Drainage of Right Pulmonary Vein into Inferior Vena Cava: Report of a Case, with a Radiologic Analysis of the Principal Types of Anomalous Venous Return from the Lung. V. A. McKusick and R. N. Cooley. New England J. Med. **252:**291-301 (Feb. 24) 1955 [Boston].

A case of anomalous return of the pulmonary veins to the inferior vena cava is reported in a 26-year-old Negro woman. She was first seen at the time of her first pregnancy, when she was 17 years old. At that time, she was asymptomatic, but routine x-ray examination of the chest revealed a peculiar cardiac configuration with prominence of the right border interpreted as cardiac displacement. Five years later (she was still asymptomatic) examination showed bulging of the right cardiac border and pulmonary artery segment, a possible decrease in the normal prominence of the left border of the heart and aorta, and, in the right lung field, a sickle-shaped or inverted-comma-shaped shadow with its lower extremity in the region of the right cardiophrenic angle. Angiocardiograms revealed dilatation of the right atrium, ventricle, and main pulmonary artery. The left atrium, ventricle, and aorta were perhaps smaller than normal. The sickle-shaped shadow filled at the same time as the veins of the left lung and showed a clear communication with the inferior vena cava at a point just below its entry into the right atrium. Whether this anomalous right pulmonary vein perforated the diaphragm in its course to the vena cava could not be established with certainty. There was a suggestion that the right inferior pulmonary vein emptied normally into the left atrium. The patient passed through six normal pregnancies without event but became moderately obese and had easy fatigability, mild dyspnea on exertion, and cardiac consciousness (palpitation) when she lay on her left side. A dye-dilution curve obtained after injection of dye into the left pulmonary artery at cardiac catheterization was normal and specifically gave no evidence of recirculation such as might occur from left pulmonary veins discharging into the right atrium. Pressures on the right side of the circulation were normal. Pulmonary blood flow was elevated to 5.1 liters per square meter of body surface area per minute, but systemic flow could not be calculated from the data obtained. At least 13 other cases of this anomaly have been diagnosed during life; symptoms were often severer than those of this patient, but, in general, the defect is compatible with long life and mild disability of late onset. The radiological features of 19 cases, exclusive of this one, representing eight varieties of anomalous drainage, are presented. In retrospect it appears that a malformation of this type could have been at least suspected from the ordinary roentgenogram of the chest in 11 of the patients. In five other cases angiocardiography suggested or established the diagnosis.

ANESTHESIA

Meningitis Following Spinal Anesthesia: Prevention. A. Tello Ortiz and C. Van Der Hofstadt Alberola. Med. clín. **23:**409-416 (Dec.) 1954 (In Spanish) [Barcelona, Spain].

Observations were made on 30 patients who had percaine or novocaine spinal anesthesia for an operation and on a group of controls. Two intramuscular injections of an antihistamine drug were given to 18 patients immediately after the operation and 12 hours later respectively. The drugs used were Antazoline (Antistine) and diethyl-amino-ethyl phenothiazine hydrochloride, in doses of 0.1 gm. and 50 mg. respectively. An intramuscular injection of corticotropin (ACTH) in doses of 3 or 5 mg. was given to 12 patients immediately after the operation. The cerebrospinal fluid was normal in all cases before the operation. Twenty-four hours after the operation, it was normal in 13 out of the 18 patients who had received antihistamine drugs and in 11 out of the 12 patients who had received corticotropin. In the remaining cases the changes of the cerebrospinal fluid were those of moderate or subacute meningitis, with the typical characteristics of acute aseptic meningitis in the cerebrospinal fluid of the controls. The cerebrospinal fluid was obtained 30 hours after the operation in two cases of pleocytosis. The presence of headache was investigated in all cases. All the patients with normal cerebrospinal fluid 24 hours after the operation had no headache. The patients with changes in the cerebrospinal fluid had moderate or subacute headache. The headache was acute or subacute in the controls. Six additional patients who did not form part of any of the afore-mentioned groups had acute headache after percaine or novocaine spinal anesthesia. An intramuscular injection of synthetic antihistamine drugs controlled headache in a few hours. The authors conclude that spinal anesthesia causes a meningeal inflammation with a final phase of leukocytic diapedesis that is the cause of headache. The reaction can be prevented and controlled by the antihistamines and corticotropin.

BOOK REVIEWS

Surgery of the Heart. By Charles P. Bailey, M.D., M.Sc., L.L.D., Professor and Head of Department of Thoracic Surgery, Hahnemann Medical College and Hospital, Philadelphia. Cloth. $25. Pp. 1062, with 674 illustrations. Lea & Febiger, 600 S. Washington Sq., Philadelphia 6, 1955.

Most of what is known about cardiac surgery is in this fine book, but no author can possibly keep up with the constant innovations and improvements in this rapidly expanding branch of surgery. The Herculean task of assembling in book form what is known about cardiac surgery has been adequately done. The author reviews the work from all countries and draws heavily on his own experience. The book is a compilation rather than a textbook, because many of the procedures are still in the trial stage. This statement is not a criticism. Ordinarily, a textbook in its strictest sense is a repository of proved and accepted procedures. The cardiac surgeon should therefore weigh and evaluate some of the suggested operations with the help of extensive material that is being published every day. The book is well written. The illustrations leave something to be desired. For those who have had little experience in cardiac surgery and therefore have difficulty in forming mental images in three dimensions, many of the illustrations are too simplified to be helpful. One-fourth of the book is devoted to mitral disease, and fortunately so, because the author has had vast experience in this particular field. This book is recommended for everyone who is interested in cardiac surgery. A volume soon to be published by the cardiologists of the Bailey Clinic should be a good companion to this book.

Reactions with Drug Therapy. By Harry L. Alexander, M.D. Cloth. $7.50. Pp. 301, with 33 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; W. B. Saunders Company, Ltd., 7 Grape St., Shaftesbury Ave., London, W.C.2, England, 1955.

This book presents a comprehensive and up-to-date discussion of hypersensitivity to drugs, one of the serious problems of modern pharmacotherapy. After reviewing the mechanisms of action of drug reactions, the author describes the various dermatological and systemic patterns of drug hypersensitivity and lists separately the drugs that induce these reactions frequently, or only occasionally. After this orienting discussion, the various drugs associated with hypersensitivity reactions and the reaction they may evoke are discussed in an orderly and systematic fashion. Numerous excellent photographs and photomicrographs supplement the text, and there is an extensive bibliography at the end of each chapter. The book can be recommended as a reference for the practicing physician, who, since the introduction of sulfonamides and antibiotics, has been faced with the diagnosis and treatment of an increasing number of drug reactions.

Amputations. By Leon Gillis, M.B.E., M.B., B.Ch., Consultant Orthopædic Surgeon to Queen Mary's (Roehampton) Hospital, London, S.W.15, England. Cloth. $12.75. Pp. 423, with 343 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1954.

The author has presented clearly his wide experience with amputations of the upper and lower extremities. This information may be used easily by the surgeon in solving specific problems such as site of amputation, methods of amputation, painful stumps, and special prostheses. The author's opinion concerning the inadvisability of using long forearm, thigh, and leg stumps is controversial. He has been influenced by the difficulty the limb manufacturer has in applying certain recent developments in order to make long stumps functional. From the literature and his own experience the author has selected basic information that is of interest to physicians, nurses, physiotherapists, and medical students. The book has a detailed bibliography and is easy to read. The print is clear, and the illustrations are excellent and well selected. The artificial limbs illustrated show excessive leather and minimal use of the more desirable plastic material.

These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

Correlative Neurosurgery. By Edgar A. Kahn, Robert C. Bassett, Richard C. Schneider and Elizabeth Caroline Crosby. Contributors: Basu K. Bagchi, and others. With Foreword by Kenneth G. McKenzie, M.B., F.R.C.S. Cloth. $19.50. Pp. 413, with 235 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto, 2B, Canada, 1955.

Beside the 4 principal authors, 10 colleagues have contributed chapters or sections of varying size in this neurosurgical text. All but the plastic surgeon were trained at the University of Michigan or were associated with the late Max Peet. Each is well known in his or her field of special interest. The book is intended for young neurosurgeons about to commence practice and also for undergraduate medical students. Its principal virtue lies in the correlation of clinical neurology and neuroanatomy; most of this material is contributed by Dr. Crosby in the sections that follow the clinical material for which the anatomy is elucidated. A short chapter on clinical diagnosis of expanding intracranial lesions is followed by chapters on x-ray, electroencephalographic, and isotopic diagnosis. There is no chapter on angiography as such, although reference is made to the characteristic pattern of glioblastomas as an aid to diagnosis and permissive biopsy in glioblastomas of the dominant hemisphere. Angiograms are shown in the chapters on meningiomas, metastases, and abscesses, and especially in the part on vascular lesions of the brain and spinal cord. Unfortunately, there is no discussion of the relative merits of common versus internal carotid artery ligation for aneurysm of the intracranial carotid nor discussion of why ligation is preferred to intracranial clipping.

Lobotomy is still referred to as "prefrontal" in the chapter by David Freeman; his attitude toward lobotomy is less pessimistic than that of Kahn in the later chapter on operations for the relief of pain. Extensive directions for chordotomy are given in this chapter. The importance of aphasic disturbances in localization is discussed by deJong. Metabolic changes and endocrinological disorders are described by Bauer before the chapters by Kahn on tumors of the sellar region and third ventricle. Tumors of the posterior fossa, cerebellopontile angle, and spinal cord are then described. It would have been helpful to have some details of certain procedures (such as the ventriculographic position of Johnson and List), which are only mentioned by the names of their proponents. The chapters on injury to the head and spinal cord are properly lengthy in view of the probability that the young neurosurgeon will see such patients more frequently than those with brain tumors. Detailed statistics on the need for fusion after intervertebral disk removal would give support to the neurosurgeon who has to defend himself against orthopedic colleagues. Discography and interbody fusion are not mentioned. Developmental anomalies of the skull and the central nervous system are well described by List and Kahn, but details of surgical treatment are scanty, especially for one seeking to know which treatment of hydrocephalus should be tried first.

This book is uneven in coverage of neurosurgery and its related fields; neuroanatomy is best covered. It is strange that surgery of the autonomic nervous system is completely omitted in a neurosurgical text by Peet's successors. Physically, the book is impressive, with large page size, legible print, numerous clear illustrations, and only a few typographical errors. One wonders about the large size of some illustrations (an example of this is the series on treatment of cerebrospinal rhinorrhea) and the duplication of some anatomic figures. The radiographs are beautifully reproduced. The text was, in part, edited by Professor Litzenberg of Michigan's English department, to good effect. The complexity of the anatomy of the temporal lobe connections makes for difficult reading (some of which is in small type), but most of the other anatomic sections are quite clear. The chapter on electroencephalography is difficult to read, both as to style and as to tracings, which are often reduced excessively and which sometimes bear legends that refer to findings admittedly not shown. The percentages of accuracy of localization claimed exceed those obtained in other laboratories. Electromyography

and peripheral nerve surgery go unmentioned. The purpose of the book is not quite fulfilled as far as the young neurosurgeon is concerned. Lacking the volume of experience that enables him to keep all procedures fresh in his mind, he needs details, such as presented for rhizotomy of the trigeminal nerve, tractotomy, placement of burr holes for hematomas, and indications for laminectomy. Similar information is needed for such other procedures as prevention of pantopaque getting into the basilar cisterns when looking for foramen magnum difficulties, use of the electrocoagulation unit for removing vascular malformations of the spinal cord, and approach to an aneurysm of the anterior cerebral artery. In the foreword, Kenneth McKenzie says appropriately: "Essentially, this volume details in an interesting and personal way the manner in which day-by-day neurosurgical problems are looked after in this large teaching center in Ann Arbor."

Angina pectoris: Entstehung, Erkennung, Beurteilung und Behandlung der Herzschmerzanfälle. Von Prof. Dr. W. H. Hauss, Oberarzt der I. medizinischen Klinik der Johann-Wolfgang-Goethe-Universität, Frankfurt a.M. Mit einem Geleitwort von Prof. Dr. Ferdinand Hoff, Frankfurt a.M. Cloth. $14.15; 59.40 marks. Pp. 394, with 127 illustrations. Georg Thieme, Herdweg 63, (14a) Stuttgart, Germany; agents in U. S. A. and Canada, Intercontinental Medical Book Corporation, New York 16, 1954.

The author does not limit himself to the discussion of angina pectoris as defined by Heberden but uses the term to include myocardial infarction and anginal type pain of noncardiac origin. The book deals with the history of the syndrome; the anatomic and physiological basis of anginal pain; the clinical aspects of angina pectoris, including that of myocardial infarction; the associated pathophysiological problems; and the differential diagnosis, prognosis, and treatment of angina pectoris and of myocardial infarction. These subjects are discussed thoroughly, with numerous quotations from the literature and an extensive bibliography. Much space is devoted to the author's theory of interferences via nervous pathways. The discussion is frequently rambling and repetitious, with a tendency to use high-sounding but ambiguous expressions rather than simple and precise terms. The fact that true angina pectoris is, in the last analysis, a symptom of myocardial ischemia, becomes lost in the discussion of numerous unsubstantiated hypotheses. The chapter on treatment contains a host of highly controversial recommendations, such as the use of "heart hormones," adenosine triphosphate, and adrenal irradiation. The prophylactic use of glyceryl trinitrate (nitroglycerin) for angina pectoris and the use of mercurials as an emergency measure for congestive heart failure following infarction, however, are not mentioned. The presentation of anticoagulant therapy is insufficient as a practical guide for the inexperienced. The book may be of interest to those who might enjoy a rather unorthodox and somewhat philosophical discussion of angina pectoris and many borderline topics.

Radioisotope Conference, 1954. Volume I: Medical and Physiological Applications. Volume II: Physical Sciences and Industrial Applications. Edited by J. E. Johnston, assisted by R. A. Faires and R. J. Millett. Proceedings of second conference, Oxford, 19-23 July, sponsored by Atomic Energy Research Establishment, Harwell. Cloth. $10.80; $7.50; or $16 per set. Pp. 418; 223 with illustrations. Academic Press, Inc., 125 E. 23rd St., New York 10; Butterworths Scientific Publications, 88 Kingsway, London, W.C.2, England; 1367 Danforth Ave., Toronto 6, Canada, 1954.

Volume 1 of this remarkable work consists of 46 papers, contributed by various participants at the conference, dealing with medical and physiological applications of various radioactive isotopes. The wealth of new methods and materials that has become available to medical science since the discovery of artificial radioactivity is impressed on the reader more deeply than ever. In addition to reports on the familiar isotopes such as carbon 14 and iodine 131, here are reports of studies with iridium 192 in carcinoma, bismuth 206 in diffuse neoplastic disease, tantalum 182 in melanoma iridis, chromium 51 for studies on thrombocytes, and others too numerous to mention. Especially ingenious is the use of yttrium 90 to demonstrate the effect of chelating agents in hastening the excretion of metallic poisons and the use of screws and screwdrivers rendered artificially radioactive to discover the source of trouble-making metallic particles in bone surgery. Volume 2 consists of 24 papers on applications of artificial radioactivity in the physical sciences and the industries. Although it is of less immediate importance to most medical readers, it is interesting and valuable. Both volumes are well edited, and the lack of an index is somewhat offset by the brevity of the papers, which makes it possible to locate subjects pretty well through the table of contents. This work is highly recommended.

The Abnormal Pneumoencephalogram. By Leo M. Davidoff, M.D., Professor and Chairman, Department of Surgery, Albert Einstein College of Medicine, New York, and Bernard S. Epstein, M.D., Chief, Department of Radiology, Long Island Jewish Hospital, New Hyde Park, N. Y. Second edition. Cloth. $15. Pp. 518, with 696 illustrations. Lea & Febiger, 600 S. Washington Sq., Philadelphia 6, 1955.

This is an excellent volume analyzing in great detail the air studies in many diseases of the brain. It is divided into two major parts, one covering tumors and the other nontumorous lesions of the brain. In the section on tumors, one chapter is devoted entirely to gross and microscopic lesions of the brain. Excellent microphotographs of the various tumors are illustrated, along with an adequate discussion of the microscopic findings. Classification and incidence of Cushing's 2,000 verified cases are shown in tabulated form. The tumors are further discussed under separate chapters according to the lobe or portions of the brain involved. In each chapter the encephalogram is discussed in detail, and excellent roentgenograms are shown. In addition, the literature and the author's own cases are reviewed. Under the part on tumors a section is devoted to nonneoplastic tumors. This includes separate chapters on chronic subdural hematoma, brain abscess, syphilis, vascular anomalies, aneurysms, and cerebral hemorrhage and thrombosis. The second part, which covers nontumorous lesions of the brain, deals with congenital anomalies, various infections, cerebral atrophy, and other lesions. Again, the literature and the author's own cases are reviewed, as well as the pneumoencephalogram. The major portion of the book is devoted to tumors. The illustrations and roentgenograms are excellent and deal with each subject adequately. The text is well written and gives clinical information, as well as detailed discussion of the encephalograms. The combined effort of the neurosurgeon and the radiologist has produced a book that correlates the clinical and radiological aspects of intracranial lesions. There has been little change since the first edition. Although the book is primarily for the neurosurgeon, neurologist, and radiologist, others interested in intracranial lesions should find it most useful.

Advances in Virus Research. Volume II. Edited by Kenneth M. Smith and Max A. Lauffer. Cloth. $7. Pp. 313, with illustrations. Academic Press, Inc., 125 E. 23rd St., New York 10, 1954.

The commendable quality of these reviews of the progress in the knowledge of the properties and nature of the filtrable viruses established in the initial volume of the series has been continued in the present issue. Two of the papers deal with virus diseases of plants, both by authorities in this field. As in animals and man, the means for treating plant virus diseases is exceedingly limited. The influence of heredity in the determination of susceptibility and resistance to infection and the important practical possibilities, as well as the difficulties, in the control of plant diseases by intensive selective breeding are discussed by Francis O. Holmes. A more direct approach to the control of plant virus diseases, analogous to the present-day intensive investigations in chemotherapy in man, is described by F. C. Bawden, who has considered the effects of naturally occurring inhibitors and other inhibiting materials in lessening the occurrence of infection and in preventing overwhelming virus growth in infected plants. A principal factor impeding progress toward effective specific treatment of virus diseases is the lack of knowledge of the nature of the intimate metabolic and physical relationships between these obligate parasites and their host cells. In this field, Preben von Magnus has given an account of the results of studies on the incomplete or earliest forms of influenza virus particles cultured in the chick embryo and in mice. W. W. Ackermann and Thomas Francis Jr. have reviewed, comprehensively, the recent rapidly increasing applications of tissue culture to the solution of problems of virus multiplication and to the practical aspects of the large-scale production of virus for the preparation of vaccines, as in the case of poliomyelitis. The expanding knowledge of the chemical and physical nature of viruses is indicated

through consideration of the constitution of the purified agents by C. A. Knight and in the excellent electronmicrographs of both purified viruses and viruses within their host cells presented by Robley C. Williams. Further evidence of the physical structure of viruses is afforded by investigations of the hydration and density of virus particles as summarized by Max A. Lauffer and Irwin J. Bendet, while the use of ionizing radiation in the study of the structure of viruses is critically reviewed by Ernest Pollard. These papers are well written, are adequately illustrated with graphs and electronmicrographs, and include good reference lists.

Vaginal Hysterectomy: Indications, Technique and Complications. By Laman A. Gray, A.B., M.D., F.A.C.S., Associate Professor, Obstetrics and Gynecology, University of Louisville, School of Medicine, Louisville, Ky. Publication number 238, American Lecture Series, monograph in Bannerstone Division of American Lectures in Gynecology and Obstetrics. Edited by E. C. Hamblen, B.S., M.D., F.A.C.S., Professor of Endocrinology, Duke University School of Medicine, Durham, N. C. Cloth. $4.75. Pp. 137, with 31 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto, 2B, Canada, 1955.

This book was written for the surgeon who performs pelvic operations and vaginal hysterectomies frequently but not so often that he is an expert at the latter. It is also for residents in training. About the same statements have been made by authors of books on operative gynecology that contain nearly all gynecologic operations, including vaginal hysterectomy. To devote an entire book to one operation is specialization indeed, but the author has turned out an excellent monograph. There are six chapters. The first is a history of vaginal hysterectomy that makes delightful reading and a review of the literature. The second deals with the indications for the operation, which, stated simply, consist of third degree prolapse of the uterus, first and second degree prolapse in late menstrual or postmenopausal life, and uterine disease alone. In the third chapter preoperative preparation is described, and in the fourth, the operative technique. The instructions given are detailed, lucid, and instructive. The procedure described is by angle suture of the ligaments and extraperitoneal drainage, followed by cystocele and rectocele repair when necessary. A list of advantages is given for vaginal hysterectomy and for repair operations done at the time of the vaginal hysterectomy. The disadvantages, contraindications, and complications are listed also. A bibliography is given at the end of the book. The illustrations are beautiful. Gray has written an excellent book, though it is very limited in scope. Unlike some enthusiasts for vaginal hysterectomy, he uses discretion in selecting the proper indications for vaginal hysterectomy and is fair about pointing out the disadvantages and complications of the operation.

Christopher's Minor Surgery. Edited by Alton Ochsner, M.D., F.A.C.S., William Henderson Professor of Surgery, Tulane University of Louisiana School of Medicine, New Orleans, and Michael E. DeBakey, M.D., F.A.C.S., Professor of Surgery, Baylor University College of Medicine, Houston, Tex. Seventh edition. Cloth. $9. Pp. 547, with 251 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, England, 1955.

The editors of this edition have drawn upon collaborators who are members of their own departments of surgery, most of whom are junior associates. Inasmuch as the book is a textbook, it lacks the seasoned clinical surgeon's point of view, which was so evident in all previous editions. One gets the feeling of inbreeding of opinions, particularly where cotton is so strongly urged as a suture material, in chapter 1. The book is divided into sections, each by different authors: (1) general considerations, (2) skin and subcutaneous (adjacent) tissues, (3) musculoskeletal system, (4) alimentary tract, (5) peripheral vascular diseases, (6) genitourinary system, (7) the head, and (8) the nervous system. In the chapter dealing with tumors, an illustration is presented of a patient with carcinoma of the thyroid. A short discussion follows. This seems out of place in a textbook titled "Minor Surgery." The style is uniform and crisp. The illustrations are well documented and aptly placed. Selective bibliographies are given at the end of each chapter. This book, which has been a landmark and standby in the past, has lost standing. It could be classified in its present form as a monograph of one school of surgeons' point of view.

The Medical Care of the Aged and Chronically Ill with Particular Emphasis on Degenerative Disorders, Advanced Cancer and Other as Yet Incurable Diseases. By Freddy Homburger, M.D., Research Professor of Medicine, Tufts College Medical School, Boston. Cloth. $5.75. Pp. 253, with illustrations. Little, Brown & Company, 34 Beacon St., Boston 6, 1955.

This small volume is unique in that it provides detailed information and instructions, in semitechnical language, for the medical and nursing care of the ever-increasing number of aged and physically handicapped patients. The author draws his information from a vast experience gained in cancer hospitals and institutions for patients with chronic disease. The book is in no sense a textbook, and while it contains an adequate bibliography at the end of each chapter, it does not pretend to be a reference book. It is a practical guide of extreme usefulness to physicians, especially those in general practice, on whom so many families depend for advice concerning the invalid in their home. Whether the patient is the victim of incurable cancer, hemiplegia, paraplegia, arthritis, or malnutrition, is suffering from complications involving the urinary tract, gastrointestinal tract, central nervous system, or from pressure sores, the answer is readily available in simple, sympathetic language. Nurses (both trained and practical), medical students, and even the members of the patient's family should find the information in this book of extreme interest and assistance. General nursing care, nursing procedures, and even apparatus for use in the home are appropriately treated. The book is attractively and uniquely illustrated by reproductions of pen-and-ink sketches by Raoul Dufy, which contribute a cheerful touch to the text. This handy, interesting volume serves its purpose well.

Archiv und Atlas der normalen und pathologischen Anatomie in typischen Röntgenbildern. Bronchus und Tuberkulose: Bronchoskopische und bronchographische Untersuchungen der Bronchen bei der Tuberkulose. Von Dr. med. A. Huzly, Sanatorium Schillerhöhe der Lva. Württemberg, Stuttgart-Gerlingen, und Dr. med F. Böhm, Heilstätte Uberruh der Lva. Württemberg, Isny. Ergänzungsband 73, Fortschritte auf dem Gebiete der Röntgenstrahlen vereinigt mit Röntgenpraxis, herausgegeben von H. Holthusen und R. Glauner. Cloth. 57 marks; $13.55. Pp. 138, with 258 illustrations. Georg Thieme, Herdweg 63, (14a) Stuttgart, Germany; [agents in U. S. A. and Canada, Intercontinental Medical Book Corporation, New York 16], 1955.

In this book the authors record their observations during many years of study of the bronchial system in pulmonary tuberculosis and in tuberculosis of the bronchopulmonary lymph nodes and pleura as recorded by bronchoscopy and bronchography. The bronchologically determined changes of a large number of operative preparations are compared with the anatomic findings and with the roentgenographic bronchial findings. There is elaboration of the clinical and roentgenologic disease picture, with the concomitant changes in the bronchial system under repeated bronchoscopic and bronchographic control. The type of bronchial involvement in all forms of pulmonary tuberculosis from the isolated round focus (tuberculoma) through the circumscribed fine nodular lesions to complete total overshadowing is described. The mechanical effects of collapse therapy and other forms of treatment are discussed. This monograph gives an excellent, rounded survey of the problem. It is a well-prepared treatise based on practical observations and study and deserves a wide audience.

Chirurgie de la main: Livre du chirurgien. Par Marc Iselin, chirurgien de la Maison de Nanterre. Second edition. [Bound together with Chirurgie de la main: Livre du praticien. Fourth edition, 1946.] Cloth. 6,000 francs. Pp. 626, with 325 illustrations; 359, with 135 illustrations. Masson & Cie, 120 boulevard Saint-Germain, Paris, 6e, France, 1955.

The new material in this two-in-one volume is contained in the first part of the book. The division into two parts dates from the third edition (1940), when it was recognized that the problems of reparative surgery were the province of the surgical specialist, while the general practitioner was more concerned with such common (though nonetheless exacting) problems as fracture, sprains, and infections. The present edition represents a complete rewriting of the section on reparative surgery based on 10 years of clinical observation. It not only brings the technical material up to date but it also reflects the recent attitude of leading surgeons for whom surgery of the hand is no longer lumped under minor surgery but is a proper subject for special attention and research. The author also suggests that it may

properly be considered a "specialty" of the general surgeon, in which he must combine the skills of the plastic surgeon, neurologist, and orthopedist. The contents of this part on reparative surgery are divided into three main sections dealing with sequelae of traumas, acquired affections, and congenital malformations. An introductory discussion of examination and diagnosis is followed by a chapter on nonsurgical treatments, appliances, and physiotherapy. This is followed by a discussion of surgery of the skin, bones, joints, tendons, and nerves; amputations and their sequelae; and reconstructions and prosthetics. The second section includes a discussion of Dupuytren's contractures, tenosynovitis, arthritis and resulting deformities, and tumors. Part of this material was prepared with the collaboration of M. Vassitch. The third section describes the surgical treatment of anomalies. The author's authority and experience are supported by numerous case histories from his own service. The second part of the book, the "Livre du Practicien," in the third edition, has received the recognition of an English translation, which was reviewed in THE JOURNAL in 1940. The fourth edition reflects several recent advances, including the use of sulfonamide powder, which widens the possibility of primary suture; systematic advances in skin grafting and reconstruction of damaged surfaces; and the use of sulfonamides and penicillin to accelerate healing of local infection and reduce the frequency of operation. There is a new chapter by Dr. B. Dumas on the treatment of whitlow with copper sulfate for the medical evacuation of the site of the infection. Also interesting is a table evaluating incapacities through loss and injury to parts of the hands. Both parts of this work have been noted for their attempt at complete coverage of every conceivable lesion of the hand and inclusion of minute details of treatment. This effort is continued in the latest edition. Its general excellence entitles it to the highest commendation.

Einführung in die Physiologie des Menschen. Von Hermann Rein. Eleventh edition edited by Dr. Max Schneider, o. Professor der Physiologie der Universität Köln. Cloth. 48 marks. Pp. 685, with 481 illustrations. Springer-Verlag, Reichpietschufer 20, (1) Berlin W. 35 (West Berlin); Neuenheimer Landstrasse 24, Heidelberg; Göttingen, Germany, 1955.

In this 11th edition of a work begun in 1936, the chapters on the kidneys, hormones, muscles, and peripheral and central nervous systems have been completely rewritten, and there has been extensive rewriting of such subjects as electrocardiography, regulation of respiration, vitamins, color vision, hearing, and other aspects of sensory physiology. The divisions and sequence of the subject matter have been retained and so has the smooth style. The book is at the other end of the scale from the excessively outlined or catchword type of textbook. The text, illuminated with a wealth of cleanly drawn diagrams, is explicit and concrete. An especially good section on physiological optics includes an intelligible explanation of the concept of the horopter. This should be welcome to innumerable students who in the past have been exasperated by wrong or inadequate statements on the subject in other textbooks. This work is recommended to both teachers and students of physiology.

The Ciba Collection of Medical Illustrations. Prepared by Frank H. Netter, M.D. Volume 1: Nervous System: A Compilation of Pathological and Anatomical Paintings. With foreword by John F. Fulton, M.D., Sterling Professor of History of Medicine, Yale University School of Medicine, New Haven, Conn. Volume 2: A Compilation of Paintings on the Normal and Pathologic Anatomy of the Reproductive System. Edited by Ernst Oppenheimer, M.D. With foreword by John Rock, M.D., Clinical Professor of Gynecology, Harvard Medical School, Cambridge, Mass. Cloth. $6; $13. Pp. 143; 286, with color plates. Ciba Pharmaceutical Products, Inc., 556 Morris Ave., Summit, N. J., 1953; 1954.

The people responsible for the compilation of these books are to be commended for their interest and support. Dr. Frank H. Netter has long been known as a medical illustrator. His work is probably familiar to most medical students and practitioners in the United States. They know the quality of his work and will not be disappointed in the illustrations chosen for the Ciba collection. The pictures are vivid and clear, the presentations dramatic. Student and practitioner will find these books informative, helpful, and worthy of use for ready reference. The quality of the paper, choice of type, and the accompanying descriptions match the excellence of the illustrations.

Prisoner in Paradise. By Garet Rogers. Cloth. $3.95. Pp. 438. G. P. Putnam's Sons, 210 Madison Ave., New York 16, 1954.

This novel is a well-written and absorbing story of the bizarre career of one who, in his poverty-stricken youth, made up his mind that the practice of medicine represented a goal that had as its fulfillment wealth, power, and prestige. His intellectual attainments were such that he was alleged to have been able to coach the son of wealthy parents through medical school. He might have accomplished his goal if, under questionable circumstances, he had not given aspirin to a woman in backwoods country who was suffering from tetanus. A politically ambitious local prosecutor unjustly caused him to be tried for murder and imprisoned. His subsequent career included his acting as assistant to an alcoholic prison physician. After his pardon, he was unable to obtain a license or to continue his medical education, and he turned to cultism in southern California. This had for him a reward in the form of wealth and prestige, along with the turmoil caused in his mind by his contact with the brutal aspects of cultism. These aspects included the performance of abortions, the refusal to surrender victims of organic disease to reputable doctors of medicine, and the general ignorance, greed, mental attitude, and commercialism of his cultist associates. The book provides a seemingly authentic behind-the-scenes view of a quack in operation. It classifies the "drugless healers" and the fools on whom they feed. The story might have been more useful, from an educational standpoint, without the overemphasis on the Freudian aspects of the characters and the amours of the principal. This may serve to make the book unsuitable reading for a substantial segment of the population.

Clinical Cytology Using the May-Grünwald-Giemsa Stained Smear. Volume I: Text. Volume II: Atlas. By P. Lopes Cardozo, M.D., Medical Superintendent, Bethel Hospital, Delft, Netherlands. With chapter on Prostatic Cytology by J. Posthuma, M.B., Cytologist, Surgical Clinic, University Hospital, Leiden. Cloth. 72.50 guilders per set. Pp. 128; 191, with 199 illustrations. L. Stafleu, Stationsweg 10, Leiden, Netherlands, 1954.

These two volumes concern the general aspects of cytology and present a continental point of view in this rapidly changing field. The text is a translation into English, and this fact is readily apparent from the style, which often appears stilted; however, this defect is more than counteracted by the enthusiasm of the author, who is anxious to reveal the practical applications of clinical cytology. Occasionally he seems to go too far in his arguments. The May-Grünwald-Giemsa staining of the smear is given special preference. The first volume describes techniques and applications of hematological cytology, cytology of material aspirated from various organs, and exfoliative cytology. The author discusses the value of cytological diagnosis for the clinician, the general principles of techniques, the relation of smear cytology to the histological methods, and the characteristics of tumor cells. More interesting is the special part in which the author concentrates on the results of puncture of spleen, thyroid, lung, and tumors of the neck, as well as of localized skeletal lesions. Here he refrains from discussing in detail the observations well worked out by others such as those on vaginal smears. He further discusses the cytology of pleural and ascitic fluid and of prostatic secretion. Each chapter is supplemented by literature. The second volume contains excellent illustrations, many in color, which are fairly well described. The book should be of interest to anyone who wishes to acquaint himself with the European thinking in cytology and who wants to read about problems and an approach not extensively discussed elsewhere. If a critical attitude is applied to many of the author's statements, the reading should be enjoyable.

Introductory Foods. By Osee Hughes. Third edition. Cloth. $4.75. Pp. 551, with 134 illustrations. The Macmillan Company, 60 Fifth Ave., New York 11, 1955.

The new edition of this popular college textbook continues to uphold the excellent reputation of the first two editions. Since many students taking a course in food selection and preparation have not had courses in basic nutrition, the first part of the book provides a brief general nutritional background. In its discussion of the various food groups and their preparation, stress is placed on nutritive value and maximal conservation of the nutrients naturally present. Those interested in food preparation and meal planning should find this book useful.

QUERIES AND MINOR NOTES

REFRIGERATION OF VACCINES

To the Editor:—*I recently received diphtheria and tetanus toxoids and pertussis vaccine with an expiration date of June 24, 1956. The directions state it should be stored in a refrigerator at 35.6 to 50 F. It was inadvertently placed in a storeroom where the temperature varied from 50 to 60 F for about 40 days. Should the medicine be discarded? Please comment on the amount of deterioration that would take place when this same medicine is kept out of the refrigerator for three days during the summer months (temperatures of 80 to 90 F).* *M.D., Ohio.*

Answer.—Under the circumstances cited the diphtheria and tetanus toxoids and pertussis vaccine should still be effective for active immunization. Stored at the temperature stated there should be little, if any, loss of potency. Moreover, it is customary for pharmaceutical producers to have about a 25% excess of potency in order to insure that the product will be equivalent to the dosage marked on the package until its expiration date. If the triple antigens were exposed to a summer temperature of 80 to 90 F for only three days there would probably be little loss of potency. The foregoing statements would not apply to smallpox vaccine, which becomes nonpotent very rapidly when not kept in a refrigerator.

DENTAL TREATMENT OF CARDIAC PATIENTS

To the Editor:—*What recommendations should be given the dentist regarding (1) treatment of cardiac patients, especially those with a history of rheumatic carditis and coronary occlusion; those suffering anginal syndrome; hypertension with and without cardiac complications; and arteriosclerotic heart disease; (2) choice of a preanesthetic sedative, local anesthetic, and use of epinephrine derivatives to be combined with anesthetic; (3) maximum concentrations and quantity of each drug usable with reasonable safety.* *M.D., New York.*

Answer.—In providing recommendations for dental treatment of cardiac patients one must bear in mind the hazards to which the patient may be exposed. Anxiety and pain lead to rise in pulse rate and blood pressure and may precipitate angina pectoris, bouts of pulmonary congestion, or dangerous hypertensive episodes in susceptible individuals. Patients with congenital or rheumatic heart disease are further subjected to the risk of subacute bacterial endocarditis because of bacteremia during tooth extractions and other dental manipulations that disturb the gums. Certain drugs, including epinephrine and procaine (or related local anesthetics), may also result in undesirable reactions. Although the amount of epinephrine used in dental work is usually small (1 to 5 cc. of 1:60,000 to 1:100,000 solution), there is always the possibility of accidental intravenous injection. Hyperthyroid and hypertensive patients are particularly susceptible to the untoward responses noted after administration of this drug, including anxiety, cardiac arrhythmias, and sharp rises in blood pressure. Anginal pain may be induced in patients with coronary heart disease. Some patients are also adversely affected by the central nervous stimulation that procaine may produce.

In view of these hazards, certain general suggestions should be offered to the cardiac patient who requires major dental treatment. The patient should seek a dentist in whom he has the utmost confidence. Phenobarbital 15 to 30 mg. (or other barbiturate in sedative doses) may be given an hour or two before the dental treatment to relieve worry and counteract the nervous excitability that sometimes follows the use of procaine. Prolonged sessions in the dentist's chair, including the extraction of many teeth at one time, should be avoided. Patients with rheumatic or congenital heart disease should receive penicillin prophylaxis against subacute bacterial endocarditis; e. g., 600,000 units of aqueous penicillin and 600,000 units of procaine penicillin in oil containing 2% aluminum monostearate given intramuscularly 30 minutes before dental extraction. Patients with coronary heart disease and angina pectoris will often be spared an attack of coronary insufficiency if whiskey or glyceryl trinitrate is administered immediately before the dental work is to begin. Of course, dentistry should temporarily be avoided altogether in patients seriously ill with recent myocardial infarction, angina decubitus, severe congestive failure, or acute rheumatic fever. Epinephrine is widely employed in solutions of local anesthetics to limit absorption and prolong the duration of effect of the anesthetic agent. Usually it does no harm. Although there is no general agreement on this point, it seems wiser to avoid the use of epinephrine in patients with hypertensive or coronary heart disease. Procaine (1% solution) or a related local anesthetic in amounts of from 1 to 5 cc. is ordinarily well tolerated by cardiac patients, particularly if a barbiturate has been previously administered.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

ELECTROCARDIOGRAPHIC FINDINGS IN HYPERKALEMIA

To the Editor:—*In one textbook it is stated, "In general, in Addison's disease there tends to be, during periods of hyperpotassemia, elevation and sharpening of the T waves along with* shortening of the duration of systole." *In another book it is stated, "An increase in the potassium level of the blood is accompanied by the appearance of high peaked T waves,* prolongation of the *QRS* complexes *and prolongation of the PR interval leading to auricular standstill." The two quotations seem to express divergent views, one mentioning the shortening of the duration of systole while the other speaks of prolongation of the QRS complexes. What is the accepted view as to the electrocardiographic findings in hyperkalemia?*

J. Stewart Hudson, M.D., Grosse Pointe, Mich.

Answer.—The Q-T interval of the electrocardiogram is a rough measure of the duration of mechanical systole of the ventricle. Ventricular contraction begins about at the peak of the R wave and terminates usually at the end of the T wave. With increasing hyperpotassemia there first tend to be high, peaked T waves with a narrow base, and the Q-T interval may be shortened. Later, if potassium intoxication continues, conduction defects including long P-R interval or auricular standstill and ventricular bundle branch block associated with slight lengthening of the Q-T interval appear.

MULTIPLE LIPOMAS

To the Editor:—*A man, aged 40, has developed successive crops of subcutaneous, lipomatous tumors over the past five years. On two occasions, multiple operations were performed, shelling out the tumors that caused discomfort; however, the patient literally has hundreds of various sized lipomas scattered throughout the subcutaneous fat all over the body. Many of these are growing at a rapid rate. To handle them surgically is impractical except in areas where they are awkward or discomfort is present. Please advise.*

William N. Knudsen, M.D., Fresno, Calif.

Answer.—Surgical excision is the most effective treatment for lipomas. As many as 30 to 40 individual lipomas can be removed at one time with the patient under general anesthesia. Lipomas that show rapid growth should be excised, since sarcomatous changes occasionally develop. Nonsurgical methods involving the use of fat-mobilizing agents (hormones) are currently under investigation but are not yet suitable for routine use.

SERUM PROTEIN-BOUND IODINE TEST

To the Editor:—*An opinion is requested on what seem to be controversial statements about serum protein-bound iodine tests. In "Principles of Internal Medicine" (ed. 1, edited by T. R. Harrison and others, New York, Blakiston Company, 1950, chap. 55, p. 575), Drs. G. W. Thorn and P. H. Forsham state, "The administration of iodine in any form (cough syrup, radiopaque dyes, salt substitutes, or Lugol's solution) will invalidate the radio-iodine uptake, but only organic iodides will invalidate the serum protein-bound iodine." Hallman and co-author* (A. M. A. Arch. Int. Med. **87**:817 [June] 1951) *state, "After the administration of inorganic iodides in small doses (e. g., saturated solution of potassium iodide, 0.5 to 1 ml. daily for several weeks) the protein-bound iodine may remain elevated for as long as 30 days. Massive doses of iodides, such as might be used in the treatment of fungous infections, may continue to exert their effects for as long as one to four months." It has also been my impression that this test was also affected by the injection of mercurial diuretics. Concerning this, Hallman states, "Since the colorimetric method used for the estimation of the protein-bound iodine is influenced by small amounts of mercury, the effect of mercurial diuretics on the protein-bound iodine was investigated. No alteration in the value occurred after the intramuscular injection of 2 ml. of meralluride (Mercuhydrin sodium)."*

Ralph V. Ellis, M.D., Alexandria, La.

This inquiry was referred to two consultants, whose respective replies follow.—Ed.

Answer.—There are several controversial statements in the literature concerning the serum protein-bound iodine test and its evaluation. The statement quoted from Harrison's "Principles of Internal Medicine" can only be found in the first edition of this textbook. In the second edition Dr. Thorn changed this to read as follows: "Only organic iodides or large doses of inorganic iodides will invalidate the serum protein-bound iodine" (ed. 2, 1954, chap. 87, p. 616). Apparently the statement in the first edition was an error. The administration of potassium iodide or Lugol's solution in the usual therapeutic doses will elevate the protein-bound iodine level into the range of hyperthyroidism.

Apparently the literature has not adequately explained the effect of mercurial diuretics on the protein-bound iodine test. This confusion can very easily be explained by realizing that there are basically two methods of determining the protein-bound iodine level. The older method, used for research for many years, separates the iodine from the precipitated proteins by distillation. Mercury in the serum will make the protein-bound iodine reading obtained by this method falsely low. The mercury combines with iodine, making a part of the iodine nonvolatile. This part is not measurable in the final distillate. Hallman and co-authors, in the report cited by the inquirer, describe a method of determining the serum protein-bound iodine level that does not incorporate the use of a distillation apparatus. This is the method described by S. B. Barker, M. J. Humphrey, and M. H. Soley (*J. Clin. Invest.* **30**:55, 1951). The method used by Barker and Humphrey includes an ashing process. The iodine attached to protein molecules is separated in the ashing or burning process and is later redissolved to be determined qualitatively. It is not certain whether the mercury is removed in the ashing process or in one of the three washing processes. Recently an additional washing step using ethylenediamine tetra-acetic acid has been added in the hope that any remaining mercury will be removed. Protein-bound iodine determinations have been done on the serum of patients before and after the injection of mercury with no statistical difference. Also, 1 cc. of meralluride has been added to specimens of serum and these specimens tested along with plain serum; no statistical difference was found. From this experience it can definitely be said that mercury has no effect on the results of the protein-bound iodine test when the method of Barker and Humphrey is being used.

Answer.—There is good evidence that inorganic iodides administered in the usual dosage of cough preparations raise the serum protein-bound iodine level significantly. This effect may persist for several weeks and is easily recognized if total serum iodine is measured as well. The nature of the precipitated complex is not known, but it has been shown that it is not thyroxin. The intramuscular administration of mercurial diuretics causes an immediate fall in the protein-bound and total iodine levels of the serum when measured by the commonly used distillation method. These return to normal within 24 to 48 hours. It has been suggested that the decrease is due to the precipitation of insoluble complexes of mercury and iodine. The uptake of radioactive iodine by the thyroid is not altered by mercury.

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TREATMENT OF GONORRHEA

To the Editor:—*1. What is the treatment for acute gonorrheal urethritis, taking into account the desirability of not masking an early syphilis? 2. How much penicillin would mask an early syphilis to the extent that the serologic tests for syphilis would not turn positive until later than the usual four months that such tests are followed? In the event that such a case does occur, what is the longest period of time during which the blood tests should be followed, and what is the longest possible time during which such a masked infection may make its appearance? 3. Since many patients with gonorrhea contracted syphilis at the same exposure, is there any objection to treating such a patient with full course of penicillin as if he had acquired an early case of syphilis, rather than waiting for the syphilis to manifest itself clinically or serologically and then treating it?*

Ephraim M. Katz, M.D., Bronx, N. Y.

Answer.—The treatment of choice for uncomplicated gonorrheal urethritis is penicillin G in oil with 2% aluminum monostearate (PAM). A single injection of 300,000 units should be adequate in accordance with the considerable accumulated data. This dose, however, could be increased to a single injection of 600,000 units if, (*a*) the gonorrheal infection has been present for two weeks or longer and there is a possible concomitant syphilis infection, or (*b*) the facilities for clinical and laboratory examinations are not available. The larger dose would serve as added insurance against treatment failure. The amount of penicillin that might mask syphilis would depend on the duration of an effective blood serum concentration and the duration of the primary incubation stage of the syphilitic infection. The lower the serum penicillin level, the shorter the duration of the effective level, and the longer the duration of the infection, the greater are the possibilities of masking syphilis. A single dose of 300,000 units of aluminum monostearate might, in rare instances, mask a syphilitic infection. Patients should be subjected to clinical and serologic rechecks for four months. Since a single injection of 1,200,000 to 2,400,000 units of penicillin is effective in the treatment of primary syphilis, such a dose would certainly be effective for the treatment of syphilis in the incubation stage. Since, however, the incidence of concomitant gonorrheal and syphilitic infection is less than 5% and since the incidence of untoward penicillin reactions is increased with larger doses and/or an increased number of injections, the treatment of all patients with gonorrhea as if they had syphilis is not indicated.

PENICILLIN

To the Editor:—*In a respiratory infection caused by an organism susceptible to penicillin, what is the average length of time between the first dose and concrete evidence of its beneficial effect?*

M.D., New York.

Answer.—The average length of time between the first dose of penicillin and definite evidence of penicillin effect should not exceed 24 to 48 hours, and indeed with hemolytic streptococcic infections (vast majority of penicillin susceptible upper respiratory infections) an effect is frequently evident within 12 hours.

RINGING IN EARS

To the Editor:—*I would like to comment on the answer to the query "Ringing in Ears" in* The Journal, *Feb. 26, 1955, page 781. In answer to this patient of 35 years of age with so-called 30% and 18% hearing loss and with tinnitus of a nonvibratory or intrinsic type, the possibilities for diagnosis are too numerous to list. First of all a causative diagnosis must be made and then treatment instituted. Acoustic trauma and presbycusis as causes of this case as implied by the answer are not the most common ones to look for. Such things as metabolic disease, endocrine disturbance, drugs, chemicals, focal infection, Ménière's syndrome, allergic disease, and central acoustic neuropathies were not mentioned as possible causes. No doubt there were many diagnostic tests that were not done in the examination of this patient, such as nasopharyngoscopy, vestibular turning tests, calorimetry, audio tests of recruitment, nasal smear test, proper x-ray examination, and many others.*

The mere statement of therapeutic attempts with many of the drugs mentioned does not mean they were tried out in proper therapeutic levels, such as with vitamin A and nicotinic acid, and in adequate duration of time. In other words, while the query gave inadequate information on which to give a reasonable answer, the answer given was out of touch with established modern diagnostic otological methods.

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To the Editor:—*In* The Journal, *Feb. 26, 1955, page 781, Dr. A. Neumaier asks what can be done for a man 35 years of age who has complained of tinnitus in both ears for the past three years. Dr. Neumaier states that there is a definite nerve deafness, but he does not mention the various hearing tests to prove it is a nerve deafness. However, the consultant in his reply takes for granted it is a nerve deafness and suggests "the patient learn to live with it in the hope it may subside in time whether treated or not." In a young man of 35, a decrease in hearing of 30% in one ear and 18% in the other may also be suggestive of otosclerosis; especially so when his father before him suffered from a similar condition. It seems logical to advise the patient to submit to the fenestration operation on the ear with the greater loss of hearing. Even if his hearing does not improve, the chances are the tinnitus will. At any rate the young man has nothing to lose and all to gain. Today in experienced hands the fenestration operation is far more simple than the radical or modified radical mastoidectomy used to be years ago.*

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DREAMS

To the Editor:—*In response to the answer to the query on dreams,* The Journal, *March 26, 1955, page 1173, that stated that the significance of color in dreams is not established I should like to offer my observations in this matter. As a psychiatrist in private practice I have been informed of dreams in color by about 10% of my patients. The dreams vary from vivid multicolored hues to monochromatic impressions (red being the only color reported so far).*

In careful questioning as part of an investigation to determine the influence of spontaneous cerebral activity (cerebral automatisms) on behavior, I have found that patients reporting colored dreams show signs of automatic cerebral discharges that consist of myoclonic jerks shortly after falling asleep, fascicular twitchings, fleeting paresthetic sensations, and certain characteristic psychic manifestations. Because of their subclinical intensity and the lack of abnormal electroencephalographic readings such phenomena could not be classified as epileptic equivalents. The colored dreams represent spontaneous cerebral discharges affecting the retina, which then forms the background for the dream activity. The latter can be interpreted within the framework of the patient's character problem. The color-effect neither produces an emotional effect nor adds any factors to the meaning of the dream.

Other spontaneous color effects are seen in the scintillating scotomas in the migraine attacks. They, too, are seen in multicolored hues, and, what proves their localization in the periphery, their position will shift with the gaze. I should like to add as a further corroborating point that the frequency of both the scintillations and the electrical discharges as recorded in the electroencephalogram have roughly the same values. One patient who reported numerous dreams in color invariably failed to do so in the periods when receiving the anticonvulsant Mebaral in doses of ½ grain (30 mg.) three times a day.

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New York 28.

FROZEN SHOULDER

To the Editor:—*In the answer to the question on frozen shoulder, page 1360, of* The Journal, *April 9, 1955, the consultant failed to mention the use of cortisone and corticotropin (ACTH) systemically. I have treated six such cases with cortisone in the past three years with good results. The consultant states that it often requires 12 to 24 months for complete recovery, My patients have all been completely cured in from two to four weeks. The most recent case was an 82-year-old woman who had been completely unable to use her left arm because of severe pain and stiffness of the left shoulder for the previous 10 months. A roentgenogram of the shoulder was unrevealing. This patient was entirely well after two weeks of cortisone orally and corticotropin intramuscularly, combined with salicylates, infrared treatment, and active and passive exercise. She has continued to have perfectly normal use of her left arm during the past two months and has required no further treatment. In these cases, I see no need for local injections of hydrocortisone or procaine, stretching of the neck, or even diathermy, as the consultant recommends.*

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SILVER NITRATE STAIN

To the Editor:—*Concerning the removal of silver nitrate stains from skin* (The Journal, *Feb. 26, page 782), an effective way for a physician to remove such stains is as follows: Apply tincture of iodine, U. S. P., to convert the elemental silver to silver iodide. It is finely divided elemental silver that makes the stain, just as it makes the black on a photographic print; silver nitrate is colorless. Then, solubilize the silver iodide by applying x-ray or photographic fixer (or, if these are not available, a freshly prepared 25% solution of sodium thiosulfate). Third, wash with water.*

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To the Editor:—*With reference to the inquiry in* The Journal, *Feb. 26, page 782, the best way to remove silver stains from fingers is 10% sodium or potassium cyanide. I have used it for years.*

Sven Andersson,
Apoteket Falken
Orebro, Sweden.

EXCESSIVE COFFEE DRINKING

To the Editor:—*In* The Journal, *March 19, page 1069, is the question: "Does drinking 20 to 30 cups of coffee daily definitely cause any harmful effects in any person?" I would observe that aside from the comments given by the two consultants, coffee is a powerful and usually a very pleasant stimulant but that no human being is immune to the wear and tear of such daily stimulation as mentioned without paying the penalty. Persons are susceptible to drugs in varying degrees, but I am impressed by the number of those suffering from both acute and chronic caffeine poisoning. In this, as in other adventures, "safety first" is in order.*

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